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ABSTRACT

This longitudinal study examined the effects on children of three kindergarten schedules: half day, alternate day, and full day. A secondary purpose was to examine the relationship between preschool attendance and subsequent school performance. Two additional variables thought to be related to school success were also explored: children's gender, and age at initial kindergarten entry. The study conducted and combined results of three different specific assessments. The first of those studies, initiated in May 1986, a statewide survey of beliefs and practices concerning kindergarten and preschool, obtained data from kindergarten teachers, school superintendents, school district records, and parents of kindergarten children. The second study, initiated in the summer of 1986, was a retrospective analysis of the cumulative records of 8,290 elementary school pupils. The third study, initiated in the fall of 1986, was a prospective longitudinal study of two groups of almost 6,000 elementary school students. The results indicate that children who attended preschool prior to kindergarten experience greater subsequent success in elementary school than those who do not attend. The child who is most likely to succeed in the elementary grades is a girl who attended preschool, turned five in January before kindergarten entrance and attended a full-day kindergarten program. (Contains 24 references.) (AA)

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A Longitudinal Research Study of

THE EFFECTS OF PRESCHOOL ATTENDANCE & KINDERGARTEN SCHEDULE

Kindergarten Through Grade Four

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Liepsic Local Schools, Putnam County
Lorain City Schools, Lorain
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Miami East Local Schools, Miami County
Millcreek-West Unity Local Schools, New Lexington
New Riegel Local Schools, Seneca County
North Union Local Schools, Union County
Old Fort Local Schools, Seneca County
Orange City Schools, Pepper Pike
Perry Local Schools, Lake County
Pickerington Local Schools, Fairfield County
Piqua City Schools, Piqua
Ridgewood Local Schools, Portage County
Rootstown Local Schools, Portage County
Shaker Heights City Schools, Shaker Heights
South Euclid-Lyndhurst City Schools, Lyndhurst
Southeast Local Schools, Portage County
Waterloo City Schools, Waterloo
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Throughout the course of this study, John R. Cryan, professor at the University of Toledo, provided valuable input to the study. He also wrote and edited the several issues of *Research Report: An Inside Look at the Preschool/Kindergarten Longitudinal Research Study* and completed an extensive review of the literature. The framework for the study and data presented in this publication are the result of the many hours, frequent discussions, and extensive work done by Rob Sheehan, professor at Cleveland State University.

A special thanks goes to Lisa Usselman, secretary, Division of Early Childhood Education, Ohio Department of Education, who provided many hours of assistance to ensure a successful study.

BOARD RESOLUTION

As one of its major initiatives in 1985, the State Board of Education issued the following resolution:

WHEREAS The State Board of Education has studied early childhood programs; and

WHEREAS the State Board empaneled a Commission on Early Childhood Education which made recommendations about preschool, early identification, early entrance, and latchkey programs; and

WHEREAS the State Board utilized the commission report to formalize legislative recommendations regarding preschool and kindergarten programs; and

WHEREAS several of the recommendations were not funded by the legislature; and

WHEREAS additional information and data will be helpful to policy makers in the future;

THEREFORE BE IT RESOLVED, that the State Board of Education authorizes a relevant, longitudinal study of the effects of preschool and/or several options for kindergarten; and,

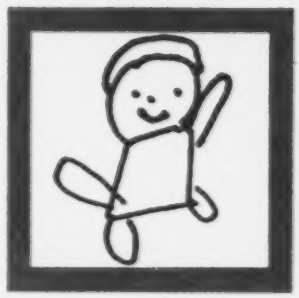
BE IT FURTHER RESOLVED, that the Superintendent of Public Instruction report the progress of the study and the relevant longitudinal data at the end of each school year throughout the study.

EXECUTIVE SUMMARY

PRESCHOOL/ KINDERGARTEN LONGITUDINAL RESEARCH STUDY

INTRODUCTION

Child development research over the past twenty years has led educators and policy makers to the inescapable conclusion that the early years of schooling (preschool through grade 3) are formative years during which a tremendous amount of learning takes place. Most children do learn but many quickly fall behind, failing to learn the basic skills in reading, language, and mathematics.



State and federal legislative initiatives have increasingly been designed to respond to this problem and that of ensuring success for all children. Additional service programs for failing children cost money and give no guarantee that the programs will work. Keeping children in school, progressing satisfactorily through the K-12 years saves money.

In 1984, The Ohio Department of Education initiated a comprehensive effort to make possible the school success of all children. The Department requested research information that would have relevance to statewide policy making in the area of early childhood education. Specifically, it sought data on the effects of various kindergarten schedules and preschool attendance as preliminary to consideration of funding full-day kindergarten and public preschools.

Existing studies focusing on the effects of different kindergarten schedules tended to be with small samples or unique populations. The studies generally failed to match the rigorous standards characteristically employed in Head Start preschool studies. Moreover, the results were mixed at best. The Department was interested in data that would be of relevance for large numbers of children in the state representing the entire range of socioeconomic circumstances. The Department also wanted to identify additional factors that might promote success in Ohio elementary schools. Accordingly, a series of statewide studies was conducted from 1985 to 1991.

This Preschool/Kindergarten Longitudinal Research Study combines the results of three studies as they pertain to the predictive value of specific variables linked to the success of children in kindergarten and the early elementary grades. The three studies used are as follows:

- A statewide survey of belief and practices concerning kindergarten
- A retrospective analysis of 8,290 children entering kindergarten in the fall of 1982, 1983, or 1984
- A prospective longitudinal study of two groups with a total of almost 6,000 children who entered kindergarten in the fall of 1986 (Cohort 1) or fall of1987 (Cohort 2)

WHAT ARE THE PURPOSES OF THE RESEARCH STUDY?

Kindergarten Schedules

The overall focus of this entire research effort was to examine the effects on children attending one of three kindergarten schedules:

- Half day (typically 5 days per week, 2.5 hours per day)
- Alternate day (typically 5 days in 2 weeks, 5 hours per day)
- Full day (typically 5 days per week, 5 hours per day)

Preschool Attendance

A secondary purpose of the research effort was to examine the relationship between preschool attendance and subsequent school performance. During the course of this study, interest developed in exploring two additional variables that might be related to school success: children's gender and age at initial kindergarten entry. These results are included in the final report.

WHEN DID THE STUDY BEGIN?

Advisory Committee

The study was guided by a 28-member advisory team appointed by the Superintendent of Public Instruction. Researchers and advisors involved in the research effort commenced planning activities in the fall of 1985. An intensive literature review was prepared during the winter of 1986. This literature review was used in considering possible research strategies and instruments that should be a part of the Ohio research effort.

Data Collection

By March 1986, three specific research studies had been recommended by the advisory team to the State Board. In May 1986, the State Board initiated the first of those studies—a statewide survey of beliefs and practices concerning kindergarten and preschool. This survey obtained data from kindergarten teachers, school superintendents, school district records, and parents of kindergarten children. The second study, initiated in the summer of 1986, was a retrospective analysis of the cumulative records of 8,290 elementary school pupils.

The third study, initiated in the fall of 1986, was a prospective longitudinal study of two groups of almost 6,000 elementary school pupils.

WHAT IS THE DATA BASE FOR THE STUDIES?

The Children in the Studies

- Children in the retrospective study entered kindergarten in the fall of 1982, 1983, or 1984.
- Children in the prospective study entered kindergarten in either the fall of 1986 (Cohort 1) or fall of 1987 (Cohort 2).

The Data Gathered in the Study

- Kindergarten schedule (half day, alternate day, full day)
- Gender
- Child's age at initial kindergarten entrance
- Previously existing standardized test data
- Incidence of grade retention
- Incidence of Chapter 1 placement
- Incidence of special education placement

Additional Data Gathered on Children in Cohort 1 and Cohort 2

- Standardized test data on Metropolitan Readiness Tests in kindergarten
- Standardized test data on Metropolitan Achievement Tests in first grade (Cohort 1)
- Standardized test data on Metropolitan Achievement Test in second grade (Cohort 2)
- Kindergarten teachers' observations of children's behavior in kindergarten
- Attendance at preschool in the year before kindergarten entrance
- Kindergarten teachers' rating of children's behaviors

The Time Periods of Data Collection

- Retrospective data were gathered in 1986 and reflected outcomes in kindergarten and grades 1, 2, 3, and 4.
- Prospective data were gathered each year since 1986.

By fall 1990, children in the prospective study who had not been retained were in grade four (Cohort 1) or grade three (Cohort 2).

The Characteristics of Participating School Districts

The participation of 32 school districts was based upon geographic location and demographic characteristics. The following sampling was used for district selection:

- Whenever possible, school districts having two or more current options of kindergarten scheduling (excluding Chapter 1 extended-day kindergartens) were asked to participate.

- In light of the small number of districts in Ohio that offer full-day kindergarten programs (excluding Chapter 1 full-day classrooms), all districts that offered full-day kindergarten (excluding Chapter 1 full-day classes) were invited and matched with demographically equivalent school districts in the same county offering an alternative kindergarten option. Demographic variables considered in matching included socioeconomic status (SES), expenditures per pupil, district size, number of schools, and number of kindergarten classes.

- To achieve an adequate geographic balance and an adequate representation of urban/central, urban, suburban, and rural school districts, districts offering only half-day kindergarten were invited and matched with demographically equivalent school districts in the same county offering alternate-day kindergarten. Demographic variables considered in matching included SES, expenditures per pupil, district size, number of schools, and number of kindergarten classes.

WHAT ARE THE MAJOR FINDINGS?

Seventy-seven percent of Ohio kindergarten programs meet on half-day schedules. Eighteen percent of Ohio kindergarten programs meet on alternate days. Five percent of Ohio kindergarten programs meet all day, everyday.

Ninety percent of Ohio kindergarten teachers have taught half-day schedules. Nineteen percent of Ohio kindergarten teachers have taught alternate-day schedules. Ten percent of Ohio kindergarten teachers have taught a full-day, everyday schedule.

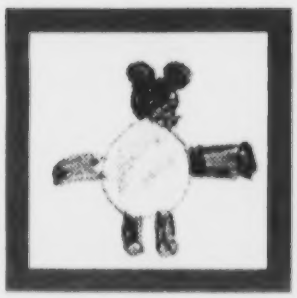
Seventy-three percent of kindergarten teachers believe their current schedule is best for children. Twenty-six percent of the half-day kindergarten teachers believe children should be taught on a full-day, everyday schedule.

Seventy-five percent of the parents of kindergarten children prefer their child's existing schedule. Thirty percent of the parents of children in half-day schedules wanted a change to full-day kindergarten.

Sixty-six percent of the parents who desired more days or longer days were willing to pay for full-day services, depending on the cost.

Fifty-six percent of the parents of half-day kindergarten children report using out-of-home care for some portion of the remainder of the day. Twenty-six percent of the parents of alternate-day kindergarten children report using out-of-home care the days their children are not in school.

Fifty-one percent of the parents surveyed have sent their child to preschool for more than six months prior to entering kindergarten. Ninety-four percent of the parents who reported that their child had been in preschool stated that preschool helped prepare their child for kindergarten.



Four percent of the school districts surveyed were planning to modify their current kindergarten schedules. Seventy-nine percent of the superintendents indicated that they would consider a future change in kindergarten schedule based on child-development data.

Findings Regarding Kindergarten Schedules

Retention rates for Ohio children in half-day kindergarten are the highest of any of the three schedules. Full-day kindergarten results in as low or lower retention rates as alternate-day kindergarten. Comparing full day to half day, retention rates suggest a modest savings to a school district offering full-day kindergarten.

Chapter 1 placements for Ohio children in half-day kindergarten are the highest of any of the three schedules in two of three possible data sets. The third data set, identified as Cohort Two, could possibly confirm the patterns of the other two sets if data were gathered for one more year. Comparing full day to half day, Chapter 1 placements suggest a modest savings to a school district offering full-day kindergarten.

Standardized test results favoring Ohio children in full-day kindergarten appeared to be gone by the end of second grade. During kindergarten and first grade, these results were approximately ten percentile points higher than half day and five to seven percentile points higher than alternate day.

Findings Regarding Preschool Attendance

Children who attended preschool had markedly lower retention rates in the elementary grades when compared to children with no preschool experience. Comparing children who attended preschool to those who didn't, retention rates suggest a modest savings to a school district offering preschool.

Children who attended preschool are much less likely to have been placed into a Chapter 1 program than children who have not attended preschool. Comparing preschool to no preschool, Chapter 1 placement rates suggest significant savings to a school district offering preschool.

The relation between higher standardized test performance and preschool attendance is quite strong, lasting well into the end of the third grade. This pattern of positive test results related to preschool attendance began in kindergarten and continued throughout the available data for this study.

WHAT ARE THE IMPLICATIONS OF THE STUDY?

The Implications of the Study

Full-day kindergarten is beneficial, and school districts should be encouraged to offer that type of schedule.

Preschool is beneficial. Therefore, initiatives regarding the development and the implementation of preschool programs should be encouraged.

Preschool attendance and full-day kindergarten have subsequent cost benefits in relation to lower retention rates in grade and fewer placements in Chapter 1 programs.

Research Design of Study #1: Statewide Survey

The research design in the 1986 statewide survey is described in detail in the 1986-87 annual report. In brief, this study was an extensive, multi-method statewide survey of kindergarten beliefs and practices and preschool usage. During May 1986, questionnaires were mailed to all public school district central offices, superintendents, kindergarten teachers, and a twenty percent random sample of kindergarten parents in every kindergarten class in Ohio. The questionnaires that were mailed were developed and field tested in spring of 1986 by research staff.

The following research questions guided the development of the survey tools used in the statewide survey.

1. What are the patterns of kindergarten schedule being used in Ohio public school districts?
2. What experiences have Ohio kindergarten teachers had with various kindergarten schedules?
3. What do kindergarten teachers think about kindergarten scheduling?
4. What do kindergarten teachers think parents want regarding kindergarten scheduling?
5. What choices do parents have regarding their child's kindergarten schedule?
6. What do parents of kindergarten children think about kindergarten scheduling?
7. Are parents of kindergarten children willing to pay for increased hours or days of kindergarten?
8. How do parents of half-day and alternate-day kindergartners care for their children during off-school hours?
9. How do parents of kindergarten children feel about the use and value of preschool?
10. Are school districts planning to modify their kindergarten schedules in the next three years? If so, how and why?
11. Have school districts considered a kindergarten scheduling change? If so, why?

Table 1, below, describes the response rate to this survey. As this table indicates, an extremely favorable response rate was obtained from each set of respondents.

Response Rates to Statewide Survey

Table 1

Respondent School Group	No. of Responses	Response Rate	No. of Public Districts
Kindergarten Teachers	2,911	89%	564
Kindergarten Parents	16,456	95%	585
Superintendents	513	83%	513
Central Offices	480	78%	480

Research Design of Study #2: Retrospective Study

The research design of the retrospective study is described in detail in the 1987-88 annual report and is summarized in Table 2. In brief, this study involved identifying kindergarten teachers in 27 carefully selected districts and then locating and analyzing the cumulative folders of children who had graduated from those kindergarten programs two, three, and four years earlier.

SUMMARY OF RESEARCH DESIGN FOR RETROSPECTIVE STUDY

Step 1: Identify 27 school districts and 120 kindergarten classes throughout Ohio to permit maximum capability of comparison of kindergarten schedule types (half day, alternate day, full day). Whenever possible, choose school districts with two or more kindergarten schedules within the same district. If necessary, match a school district offering only one type of schedule with another district offering a differing schedule in the same county.

Step 2: Locate prior classroom rosters for each teacher for children who completed kindergarten in May of 1983, 1984, or 1985.

Step 3: Locate and review cumulative folders for all children named on the rosters cited in Step 2. A total of 8,290 pupils were located.

Step 4: Gather data from cumulative folders, including all standardized test data, demographic data such as age and gender, grade retention data, and incidence of children receiving special services such as Chapter 1 and special education.

Step 5: Computerize and analyze obtained data. A total of 76,313 unique test scores were obtained for the 8,290 pupils.

Table 2

Research Design of Study #3: Prospective Longitudinal Study

The research design of the prospective study is also described in detail in the 1986-87 annual report. (See Table 3 for a summary of this design.)

Research Design of Prospective Longitudinal Study

Step 1: In the fall of 1986, identify 27 school districts and 120 kindergarten classes throughout Ohio. In the fall of 1987, identify 32 school districts and 130 kindergarten classes. Whenever possible, choose school districts with two or more kindergarten schedules within the same district. If necessary, match a school district offering only one type of schedule with another district offering a differing schedule in the same county.

Step 2: Using a systematic observation tool, conduct three observations in each kindergarten class in the study, observing the entire length of the kindergarten day, coding teachers' behaviors at five-minute intervals, and randomly sampling children at fifteen-minute intervals.

Step 3: In the spring of the kindergarten year, test each child, using the Metropolitan Readiness Tests from Psychological Corporation. In the spring of each year, test each child from grade 1 through 3, using the Metropolitan Achievement Tests (MAT) from Psychological Corporation.

Step 4: In the winter of each year, obtain from teachers an analysis of children's behaviors, using the Hahnemann Elementary School Behavior Scale. In 1986-87, these data were sought from a random sample of five children in each kindergarten. In 1986-87, these data were sought for all current kindergarten pupils.

Step 5: During each pupil's kindergarten year, obtain data on prior preschool attendance (hours per day, days per week, months per year, preschool name, and location) from pupil's parents.

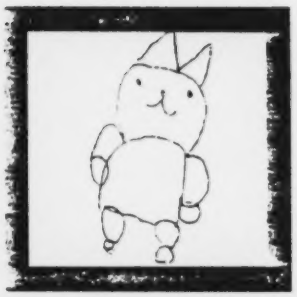
Step 6: Mail a questionnaire to identified preschools named in Step 5.

Step 7: Review the cumulative folders of all pupils in the prospective longitudinal study to determine incidence of grade retention, Chapter 1 placement, and special educational services.

Table 3

School Districts Participating in Studies #2 and #3

Table 4 indicates the geographic location and size of the school districts participating in the retrospective study and the two cohorts of the longitudinal study.



Characteristics of Participating School Districts

	Research Study		
	Retrospective	Prospective	
		Cohort 1	Cohort 2
Rural School Districts	18	18	18
Suburban School Districts	3	3	8
Urban School Districts	4	4	4
Urban/Central School Districts	2	2	2
	27	27	32
Northeast School Districts	8	8	15
Central School Districts	3	3	3
South Central School Districts	1	1	1
Northwest School Districts	5	5	4
East Central School Districts	1	1	1
West Central School Districts	4	4	4
Southwest School Districts	5	5	4
	27	27	32

Table 4

Table 5 indicates the number of children participating in the retrospective and prospective studies.

DISTRICTS OF CHILDREN PARTICIPATING IN STUDY PHASES

DISTRICT	NUMBER OF CHILDREN		
	RETROSPECTIVE STUDY	COHORT 1	COHORT 2
1	236	58	50
2	423	174	167
3	273	21	42
4	126	44	44
5	99	49	55
6	93	49	46
7	100	56	60
8	484	233	158
9	220	120	83
10	337	99	107
11	155	72	-0-
12	194	108	132
13	273	109	-0-
14	131	58	42
15	102	35	22
16	234	104	69
17	96	47	38
18	308	189	90
19	623	236	-0-
20	281	73	71
21	207	52	40
22	98	63	81
23	261	51	53
24	185	110	107
25	223	92	80
26	1929	373	353
27	599	146	148
28	-0-	-0-	42
29	-0-	-0-	80
30	-0-	-0-	221
31	-0-	-0-	45
32	-0-	-0-	46
33	-0-	-0-	41
34	-0-	-0-	228
35	-0-	-0-	40
TOTAL	8290	2821	2891

Table 5

DATA COLLECTED

The prospective study was designed to permit overall state-wide comparisons of the three kindergarten schedule types. This study was also designed to permit a number of subset comparisons within and between several school districts. A total of 16 subset comparisons are possible. The Appendix describes the formation of all subsets.

Data Collected in Studies #2 and #3

The matrix presented in Table 6 describes the types of data available from the overall research effort.

	Research Study		
	Prospective	Retrospective	
		Cohort 1	Cohort 2
Type of Data			
Achievement Data			
Kindergarten	X	X	X
First Grade	X	X	X
Second Grade	X	X	X
Third Grade	X	X	
Fourth Grade	X		
School Behavior Data			
Kindergarten Behavior		X	X
Grade Retention	X	X	X
Chapter 1 Services	X	X	X
Special Education Services	X	X	X
Classroom Observation		X	X
Preschool/Day-care Experience		X	X
Preschool Program Survey			X

Table 6

Table 7 describes the data obtained in the overall effort of the Ohio Department of Education Preschool Kindergarten Longitudinal Research Study.

Data Obtained in Ohio Preschool/Kindergarten Longitudinal Research Study

Achievement Data Gathered From Prospective Study–
All Available Standardized Test Data Routinely Gathered by District on

306	First graders
2,718	Second graders
2,397	Third graders
2,162	Fourth graders
704	No Longer in system
3	Grade unknown

From Prospective Study–

Kindergarten Achievement Data	
Metropolitan Readiness Tests (MRT)	
Cohort 1 Spring 1987	2,827 Pupils
Cohort 2 Spring 1988	2,889 Pupils
First-Grade Achievement Data	
Metropolitan Achievement Tests (MAT)	
Cohort 1 Spring 1988	1,398 Pupils
California Achievement Tests (CAT)*	305 Pupils
Cohort 2 Spring 1988	1,699 Pupils
Second-Grade Achievement Data	
All Available Standardized Test Data Routinely Gathered by District on	
Cohort 1	2,537 Pupils
Cohort 2	2,631 Pupils
Third-Grade Achievement Data	
All Available Standardized Test Data Routinely Gathered by District on	
Cohort 1	2,537 Pupils
Cohort 2	No Data

School Behavior Performance Gathered From Prospective Study–

Kindergarten Behavior Data	
Hahnemann Elementary School Behavior (HESB)	
Cohort 1 Winter 1987**	527 Pupils
Cohort 2 Winter 1988	2,570 Pupils

Preschool Attendance Data Gathered From Prospective Study–

Parent Report Obtained During Kindergarten Year	
Cohort 1	1,591 Pupils
Cohort 2	2,570 Pupils

Preschool Center Data Gathered From Prospective Study–

Survey Questionnaire Data from Preschools		
Cohort 1	No Data	
Cohort 2	1,330	Attended preschool
	1,275	Names of prior preschool obtained
	519	Unique preschool names obtained
	393	Unique names with reported address
	14	Preschools closed/moved
	146	Preschools responded with valid data
	368	Children reflected in valid data

Kindergarten Observation Data Gathered From Prospective Study–

Cohort 1-120 classrooms	30[illegible]	Observations
Cohort 2-130 classrooms	384	Observations

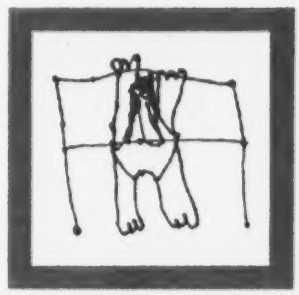
(note: Pupils receiving CAT were not tested with MAT 6)

***(note: Cohort 1 testing was of a 25% random sample of pupils)*

Table 7

In the retrospective study, and at certain grade levels in the prospective longitudinal study, the achievement data gathered consisted of whatever standardized test data had been routinely gathered by the school district. Any such data gathered were from commercially available standardized tests yielding percentiles and standard scores. Results reported in this final report are the total test scores and the subtest scores of reading, language, and mathematics.

Results presented in this final report, for the retrospective study, combine test results across several years. For example, first-grade results reflect the performance of children who experienced first grade in one of several years (1983–1986). If a child received more than one test (total test or reading-language-mathematics subtest) in a particular year, only one such test was selected randomly to present the results described in this annual report. Only one such test in a particular year was selected to prevent instances of any individual child being represented in the presented data more than once.



The outcome data gathered in the ongoing prospective study were standardized test data using the Metropolitan Readiness Tests (MRT) and the Metropolitan Achievement Tests (MAT). For Cohort 1 pupils, the MRT was administered in the spring at kindergarten, first- grade, and second grade. The MAT as administered to both cohorts at the first and second grades. As the 1988 interim report indicates, one large participating school district, a district providing all three kindergarten schedules, was unable to administer the Metropolitan Achievement Tests during the first grade for Cohort 1 children. This omission affected 304 pupils. Fortunately, standardized tests data at the first-grade level are available for three hundred four of those children, using the California Achievement Tests.

In the prospective longitudinal study, at other grade levels (second grade for Cohort 2 and third grade for Cohort 1), the achievement data gathered in

this study consisted of whatever standardized test data had been routinely gathered by the school district. Any such data gathered was from commercially available standardized tests yielding percentiles and standard scores. Results reported in this final report are the total test scores and the subtest scores of reading, language, and mathematics.

The tables presented in this report describe average performance of children in percentiles although statistical analyses were all conducted on the more stable Normal Curve Equivalents (NCEs).

Qualifications With Regard to Study #1: Statewide Survey

Limitations of Statewide Survey: The extremely high response rates obtained in the first study help to ensure that the study's findings have widespread applicability throughout Ohio. The views of kindergarten teachers can certainly be considered representative of kindergarten teachers' opinions as of the 1985-86 academic year. These opinions may have changed since the study was conducted, although we strongly suspect that the greatest single factor contributing to a kindergarten teacher's opinions is the experience that teachers have had with various kindergarten schedules. To the extent that such experiences have not changed, teacher opinions are likely to have held constant.

The sampling strategy employed for parents of kindergarten students is strong and should permit generalization to the entire population of parents of kindergarten children (during 1985-86 year) . The limitation of concern here is the normal limitation of statistical error associated with any random sampling effort. There is a small probability that statistically significant findings occurred by chance. All statistical tests were conducted at the .05 level of significance, thereby ensuring the likelihood of error to be less than five percent probability.

The respondent group with the second-lowest rate of return was that of school superintendents (83 percent). A response rate of 83 percent is still quite high for most population surveys, and we are inclined to trust the obtained data, with the exception noted that there may be some minority concern among school superintendents that is not conveyed in the results of Study 1.

The data provided by school district central offices are largely a matter of public record (e.g., class size, hours of operation, etc.). Anecdotically, we were informed that the school districts that did not respond to our request for information acted as they did because of their perceived workload at the end of the school year rather than because of antagonism toward any one kindergarten schedule or another. Once again, we are inclined to trust the information provided from the districts' central offices.

Limitations in Study 1 are likely to be greatest with regard to the questions that were not asked (or could not be asked) in the various surveys. We do not know whether parents requesting (or using) full-day kindergarten work outside the home and we are unable to speculate about the socioeconomic status of our respondents. We do not know whether the professional training received by kindergarten teachers contained any particular emphasis on one kindergarten schedule or another. We do not know the opinions held by school board members toward kindergarten schedules or toward the value of preschool education.

Qualifications With Regard to Studies #2 and #3

Limitations of Retrospective Study: The retrospective study has a number of limitations that are inherent in any form of ex post facto research. We were unable to control or describe any element of the kindergarten classes in question. They may have been high quality or of marginal quality. We are also unable to control or

describe the reasons why kindergarten children may have been enrolled in one type of schedule rather than another. Working parents may have elected to enroll children in full-day kindergarten rather than half-day kindergarten. Alternatively, families with an adult at home during the day may have elected to enroll their children in half-day kindergarten. We do not know the extent to which this may have happened nor do we know the extent to which such elective selection of kindergarten may be related to subsequent school performance. We are encouraged that the gender of pupils is quite similar across the various kindergarten schedules, as we are well aware of gender differences in kindergarten pupils' standardized test performance. (Girls typically perform better than boys on standardized tests in kindergarten.)

We do recognize a major limitation of retrospective research, namely that classes in one type of kindergarten schedule may have varied from classes of another schedule –varied in ways that are unrelated to kindergarten schedules. We hope to have controlled for this occurrence by careful selection of school districts. Our assessment of the comparability of these districts, however, was based upon an assessment made in the summer of 1985. In the retrospective study, we were examining the performance of pupils who attended kindergarten several years earlier. To the extent that retrospective data coincide with prospective data, we are encouraged in our belief that the kindergartens experienced in 1982,1983, and 1984 are similar to those kindergartens experienced last year.

A third limitation that we note in the retrospective study (and also a limitation of the prospective study) is that districts and classrooms were primarily chosen to provide a comparison of classroom schedules. While we did try to obtain a good geographic balance of school districts, the findings reported in the retrospective study (and the prospective study) are not completely generalizable throughout the state of Ohio. For example, we have more full-day classes in the northeast section of Ohio

that we do in the southwest section. This was unavoidable as we could find no preexisting full-day classes in certain geographic locales. Inference from our study sample to the entire state of Ohio cannot be made with scientific assurance.

Any research conducted in field settings without the benefit of random assignment is subject to research design limitations. One method to partially offset such limitations is to conduct a number of studies in a variety of settings. These are called "replication studies." Subset comparisons represent a form of replication study. Such "subset" comparisons are different from subtest comparisons. By definition, a subset comparison is a comparison of a smaller groups that are found within an entire study. A research design being employed without the benefit of random assignment can be strengthened by such subset comparisons.

This method has been employed in the retrospective study, as the research questions in this study can be addressed on an overall study basis, as well as on the basis of a number of subset comparisons. For example, the entire study has 4,098 students who experienced half-day kindergarten and 871 pupils who experienced full-day kindergarten. Within several districts we have pupils who experienced either one schedule or another. Analyses between schedule types can then be made for each district (or each set of comparable districts) as well as on an overall basis.

As an example of subset comparisons, one district providing data for the retrospective study had 1,442 children attending half-day kindergartens and 483 students attending full-day kindergartens. The two variations of kindergarten schedules coexisted within each of eight school buildings. Similarly, results for pupils in the third grade in 1985-86 can be compared to results for first graders in 1984-85.

There is a direct relationship between the number of subjects in a group and the ability of a statistical test to confirm statistical significance. Two groups, with average differences of 20 points, may be considered statistically different if the group sizes are 1,000 but considered to be statistically insignificant with group sizes of 100. The approach we have taken to accommodate this statistical phenomenon is to emphasize that the most credible statistical testing is that performed with the entire group of subjects in the study. Subset comparisons are made and reported in this study for purposes of indicating whether the direction and magnitude of observed differences in the subset support the overall patterns of statistically significant differences.

In general, ex post facto research, research conducted after the fact without the benefits of random assignment, should be cautiously interpreted. Such research, when strengthened by subset analyses in a variety of setting does provide a strong indication of the possible effect of kindergarten schedules, although such research cannot provide a definitive answer to research questions.

Limitations of the Prospective Study: The prospective study has some of the limitations inherent in the retrospective study. The prospective study is still being conducted in field settings without the benefit of random assignment of subjects to kindergarten schedules. Use of subset analyses (representing a number of replication studies) and careful matching of classrooms within and between districts can partially offset this limitation. Additionally, the classroom observational data provide a check to determine that the quality of instruction in classrooms is equal across the various schedule types.

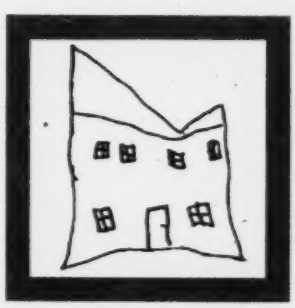
As with finding from the retrospective study, the findings of the prospective study cannot be generalized to the total state of Ohio. To the extent that children and classrooms in the various kindergarten schedules throughout Ohio are similar to

those in the study, the study findings can be generalized. This concern for external validity (the degree to which study findings can be generalized beyond a particular study population) is endemic to any research effort.

The second year (1987-88) of this prospective study included the addition of six school districts (and the loss of two school districts). Expanding the base of school districts increases, somewhat, the ability to generalize findings.

Research of this type is also plagued by a concern for historical events. This prospective study is influenced by the degree to which kindergarten education in Ohio remains constant from year to year. The most significant statewide event that we are aware of is the development of K–12 Approved Plans of Study. School districts are developing these plans in a variety of fashions. Some districts are choosing a curricular area as the focus and developing K–12 Plans of Study for each area. Other districts are developing these plans on a grade-level basis, submitting first the Secondary Plans of Study and then the Elementary Plans of Study. The ability to generalize this study may be influenced by the degree to which instructional practice is influenced by development of such plans of study.

The retrospective study was designed by the Ohio Department of Education to minimize the potential limitations of research design. The conclusions of the retrospective study should be based upon patterns of performance that are evident across a variety of settings and across several time periods. Spurious findings are likely to occur only once, or occur only with a particular group (or set of groups). We firmly believe that educational policy (and practice) must be based upon research that is conducted in realistic field settings at several time periods. The combined weight of the three studies conducted by the Ohio Department of Education represents such research efforts.



Findings From Study #1: Statewide Survey

Results of this study have already been reported to the advisory board and in the January, 1987 issue of *Research Report*. Those results are summarized as follows:

A. The most frequent kindergarten schedule in use in Ohio is the half-day schedule (77 percent). Alternate-day kindergartens represent approximately 18 percent of Ohio kindergartens, and full-day programs represent five percent of kindergarten programs. These figures are at significant variance with national statistics. The Educational Research Service reported in 1986 that 67 percent of the kindergartens in the country are half day; eight percent of the kindergartens in the country are alternate day, and 27 percent of the kindergartens of the entire country are full day.

Percent of Kindergarten Schedules Operating in Ohio Kindergartens in 1986

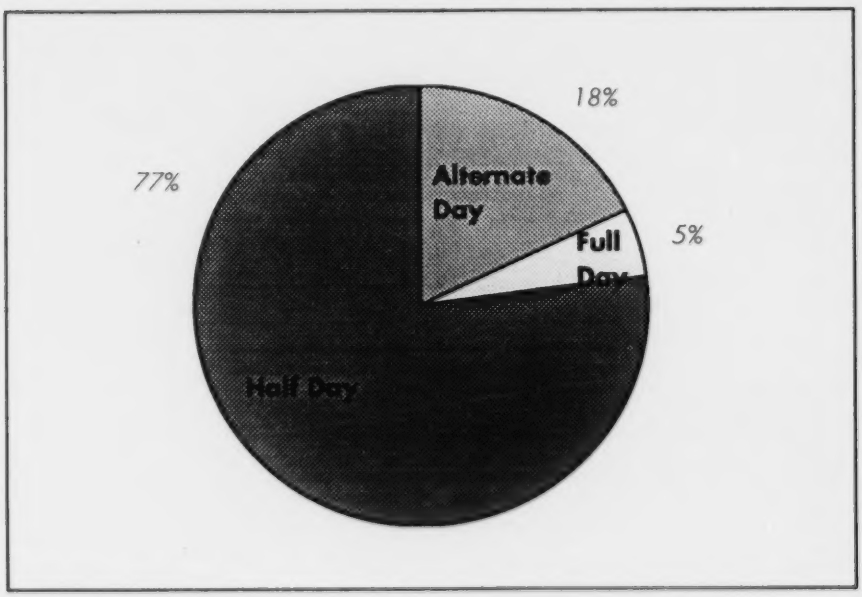


Figure 1

B. Nearly all kindergarten teachers (90 percent) have taught half-day schedules at some time in their career. Fewer kindergarten teachers (19 percent) have taught alternate-day kindergarten while only ten percent of Ohio kindergarten teachers have taught full-day kindergarten. Teachers in full-day programs had significantly fewer years of kindergarten teaching experience than did teachers in half-day kindergartens.

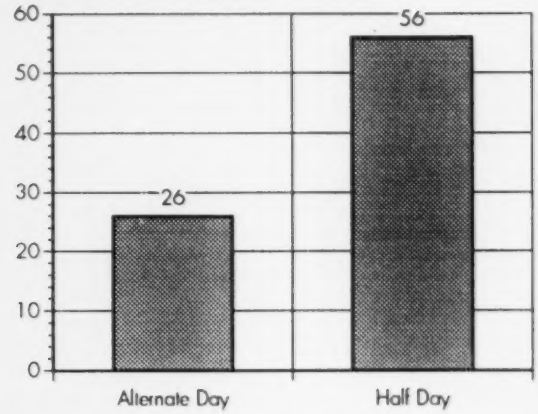
C. The large majority of kindergarten teachers (73 percent) would prefer to keep their current kindergarten schedule. A sizable group of half-day teachers would like to increase their number of hours while a majority of alternate-day teachers (sixty-four percent) want to increase the number of days to either half day or full day.

D. Similarly, a large majority of parents of kindergarten pupils (75 percent) preferred their child's existing kindergarten schedule, although only four percent of kindergarten parents report having had a choice of longer days. When parents of half-day kindergartners did want changes (29 percent of half-day parents), it was in the form of longer days, and when parents of alternate-day kindergartners did want changes (23 percent), it was for more days.

E. When parents desiring more or longer days were asked if they were willing to pay more for longer days, 60 percent said "yes" depending upon the cost.

F. One reason why parents desiring more or longer days may have been willing to pay for such a change is that 56 percent of the parents whose children were in half-day kindergartens report using out-of-home care for their children during a remaining portion of the kindergarten day. In contrast, 26 percent of alternate-day parents report use of out-of-home care. We suspect that child-care arrangements are much more difficult to make for parents of alternate-day kindergartners.

Figure 2 **PERCENT OF PARENTS USING CHILD CARE FOR KINDERGARTEN CHILDREN IN 1986**



G. The majority of parents surveyed in the study (56 percent) had sent their children to preschool for more than six months prior to kindergarten, and nearly all these parents (94 percent) were in agreement that the preschool experience had helped prepare their children for kindergarten.

H. Only seven percent of the school superintendents reported planning to modify their kindergarten schedules during the next three years. More than 40 percent of school superintendents reported having considered a change in kindergarten schedule but decided not to. The most compelling reason cited was cost. Seventy-nine percent of school superintendents reported that they would be influenced to consider a future change in kindergarten schedule based upon child development data.

Study 1 was conducted by the Ohio Department of Education to describe the statewide practices with regard to kindergarten schedules and attitudes toward the various schedules. Kindergarten teachers prefer half-day kindergarten, although few have experienced a full-day schedule. The kindergarten schedule most disliked by kindergarten teachers is the alternate-day schedule. Teachers are most comfortable with their current schedule, whatever that schedule might be. Similarly, parents are most comfortable with their current kindergarten schedule, although

when changes were desired, they were changes for more days and longer days. School superintendents are well aware of the cost issues involved in increasing the length of day of kindergarten, although they are also responsive to the possibility of child development data that might support one schedule or another.

Findings With Regard to School Achievement Overall Study Results on Academic Test Performance, Grade Retention, Special Education Placement, and Chapter 1 Placement as they Relate to Kindergarten Schedule

Defining this Factor: As noted earlier, participating school districts were selected to provide the greatest possibility for comparing the outcomes of three kindergarten schedules (half day, alternate day, and full day). Table 8 describes the number of pupils in the study experiencing each kindergarten schedule.

Schedules of Kindergarten Pupils

Schedule	Retrospective Study	Ongoing Longitudinal Study Cohort 1	Ongoing Longitudinal Study Cohort 2
Half Day	4,802	1,607	1,353
Alternate Day	2,445	886	783
Full Day	871	442	903
Unknown	172	86	21

Table 8

Direction and Magnitude of the Impact: The data gathered in both the retrospective study and the prospective longitudinal study provide a remarkably clear conclusion that participation in full-day kindergarten is positively related to subsequent school performance. The effect of this participation appears to last at least through the second grade. The strong, beneficial relationship between full-day kindergarten and later school outcomes is evident in standardized test performance, grade retentions, and Chapter 1 placements. Tables 9 through 13 present the test performance of pupils in kindergarten through fourth grade.

The most obvious conclusion from these data is that pupils in half-day kindergarten perform less well than pupils in full-day kindergarten (and in some cases less well than alternate-day pupils) and that this pattern has been occurring for several years. Differences of ten percentile points or more are common through the second grade in total test performance and in the subtest areas of reading, language, and mathematics performance. The differences appear to have diminished by the third grade, although the modest amount of available fourth-grade data do reveal a continuation of higher performance for full-day pupils when compared to half-day pupils.

Test Performance Of Kindergarten Pupils on Standardized Tests

Test Type	Half Day %	Half Day N	Alternate Day %	Alternate Day N	Full Day %	Full Day N
Total Test						
Retrospective Study	61	(3,560)	70	(2,019)	71	(857)
Prospective Study Cohort 1	50	(1,365)	51	(774)	60	(306)
Prospective Study Cohort 2	48	(1,200)	50	(703)	63	(866)
Reading						
Retrospective Study	66	(1,306)	61	(776)	71	(207)
Prospective Study Cohort 1	49	(1,494)	50	(807)	59	(429)
Prospective Study Cohort 2	46	(1,221)	50	(705)	63	(877)
Language						
Retrospective Study	54	(1,492)	66	(950)	71	(197)
Prospective Study Cohort 1	50	(1,523)	51	(839)	59	(432)
Prospective Study Cohort 2	50	(1,250)	50	(721)	60	(880)
Mathematics						
Retrospective Study	55	(1,926)	63	(1,116)	80	(289)
Prospective Study Cohort 1	51	(1,402)	53	(806)	61	(310)
Prospective Study Cohort 2	51	(1,233)	50	(725)	64	(867)

Table 9

TEST PERFORMANCE OF FIRST-GRADE PUPILS ON STANDARDIZED TESTS

	HALF DAY		ALTERNATE DAY		FULL DAY	
TEST TYPE	**%**	**N**	**%**	**N**	**%**	**N**
TOTAL TEST						
RETROSPECTIVE STUDY	65	(1,472)	66	(1,455)	77	(360)
PROSPECTIVE STUDY COHORT 1	58	(590)	63	(592)	71	(152)
PROSPECTIVE STUDY COHORT 2	63	(682)	63	(518)	66	(404)
READING						
RETROSPECTIVE STUDY	63	(2,698)	66	(1,644)	71	(651)
PROSPECTIVE STUDY COHORT 1	57	(602)	63	(601)	72	(156)
PROSPECTIVE STUDY COHORT 2	63	(714)	64	(523)	67	(410)
LANGUAGE						
RETROSPECTIVE STUDY	64	(1,213)	64	(1,121)	71	(145)
PROSPECTIVE STUDY COHORT 1	57	(623)	61	(602)	64	(159)
PROSPECTIVE STUDY COHORT 2	62	(708)	62	(531)	69	(419)
MATHEMATICS						
RETROSPECTIVE STUDY	59	(2,720)	63	(1,485)	74	(549)
PROSPECTIVE STUDY COHORT 1	57	(613)	63	(599)	62	(159)
PROSPECTIVE STUDY COHORT 2	59	(725)	61	(536)	65	(422)

Table 10

TEST PERFORMANCE OF SECOND-GRADE PUPILS ON STANDARDIZED TESTS

	HALF DAY		ALTERNATE DAY		FULL DAY	
TEST TYPE	**%**	**N**	**%**	**N**	**%**	**N**
TOTAL TEST						
RETROSPECTIVE STUDY	68	(631)	71	(697)	73	(261)
PROSPECTIVE STUDY COHORT 1	60	(527)	66	(542)	60	(126)
PROSPECTIVE STUDY COHORT 2	72	(192)	74	(190)	73	(124)
READING						
RETROSPECTIVE STUDY	63	(1,461)	71	(698)	70	(526)
PROSPECTIVE STUDY COHORT 1	58	(538)	66	(547)	61	(127)
PROSPECTIVE STUDY COHORT 2	61	(364)	63	(217)	67	(329)
LANGUAGE						
RETROSPECTIVE STUDY	66	(264)	68	(379)	84	(72)
PROSPECTIVE STUDY COHORT 1	57	(531)	63	(553)	57	(151)
PROSPECTIVE STUDY COHORT 2	59	(256)	73	(206)	64	(242)
MATHEMATICS						
RETROSPECTIVE STUDY	63	(1,510)	70	(751)	70	(525)
PROSPECTIVE STUDY COHORT 1	60	(540)	64	(551)	59	(152)
PROSPECTIVE STUDY COHORT 2	66	(293)	69	(211)	70	(328)

Table 11

Test Performance of Second-Grade Pupils on Standardized Tests

Test Type	Half Day %	Half Day N	Alternate Day %	Alternate Day N	Full Day %	Full Day N
Total Test						
Retrospective Study	68	(631)	71	(697)	73	(261)
Prospective Study Cohort 1	60	(527)	66	(542)	60	(126)
Prospective Study Cohort 2	72	(192)	74	(190)	73	(124)
Reading						
Retrospective Study	63	(1,461)	71	(698)	70	(526)
Prospective Study Cohort 1	58	(538)	66	(547)	61	(127)
Prospective Study Cohort 2	61	(364)	63	(217)	67	(329)
Language						
Retrospective Study	66	(264)	68	(379)	84	(72)
Prospective Study Cohort 1	57	(531)	63	(553)	57	(151)
Prospective Study Cohort 2	59	(256)	73	(206)	64	(242)
Mathematics						
Retrospective Study	63	(1,510)	70	(751)	70	(525)
Prospective Study Cohort 1	60	(540)	64	(551)	59	(152)
Prospective Study Cohort 2	66	(293)	69	(211)	70	(328)

Table 12

Test Performance of Fourth Grade Pupils on Standardized Tests

Test Type	Half Day %	Half Day N	Alternate Day %	Alternate Day N	Full Day %	Full Day N
Total Test						
Retrospective Study	No Data		No Data		No Data	
Reading						
Retrospective Study	57	(235)	No Data		66	(54)
Language						
Retrospective Study	No Data		No Data		No Data	
Mathematics						
Retrospective Study	59	(287)	51	(38)	65	(93)

Table 13

As the 1988 interim report indicates, one large participating school district, a district providing all three kindergarten schedules, was unable to administer the Metropolitan Achievement Tests. This omission affected 305 pupils. Fortunately, standardized test data at the third-grade level are available for 304 of those children, using the California Achievement Tests. These results are reported in Table 14. Although these pupils were tested with a different standardized measure

TEST PERFORMANCE OF STUDENTS IN PROSPECTIVE STUDY ON CALIFORNIA ACHIEVEMENT TESTS (CHILDREN NOT TESTED WITH METROPOLITAN ACHIEVEMENT TESTS)

	HALF DAY		ALTERNATE DAY		FULL DAY	
	%	N	%	N	%	N
PROSPECTIVE STUDY COHORT 1						
READING TEST	37	(145)	37	(25)	51	(129)
LANGUAGE TEST	42	(141)	39	(26)	55	(119)
MATHEMATICS TEST	42	(150)	37	(26)	61	(128)

Table 14

than the other first graders in the study, the direction of the obtained results is quite similar, with full-day pupils performing in excess of ten percentile points higher than their peers experiencing half-day or alternate-day kindergarten.

The impact of kindergarten schedules becomes even clearer when the variables of Chapter 1 placement and grade retention are considered for pupils in the retrospective study. Chapter 1 placement is based upon a child performing below the 33rd percentile on standardized tests in core areas of reading and mathematics.

As Table 15 indicates, pupils attending half-day kindergarten have been more often retained in grade and placed into Chapter 1 than pupils in the other kindergarten schedules. Table 15 indicates that children in full-day kindergarten experience the lowest Chapter 1 placement rates for the retrospective study and both cohorts of the ongoing longitudinal study. Full-day kindergarten also is associated with lower retention rates in all comparisons with half-day children. The alternate-day kindergarten schedule is associated with lowest retention rates only in the retrospective study. Quantitative differences do occur across the several studies. These differences are understandable in light of the timing of data collection and grade level of children in each study. The retrospective study children were most likely to have been retained (or in Chapter 1), as they had been in school the longest (in some cases through fourth grade) when the data were collected. The children in the prospective study, Cohort 2, were least likely to have been retained (or in Chapter 1), as they had been in school the shortest amount of time (typically three years) when the final data were collected.

Chapter 1 Placement and Grade Retention by Kindergarten Schedule

Table 15

	Percent Chapter 1	Percent Retained
Retrospective Study		
Half-Day Schedule	26	18
Alternate-Day Schedule	18	12
Full-Day Schedule	13	15
Ongoing Study Cohort 1		
Half-Day Schedule	25	16
Alternate-Day Schedule	17	12
Full-Day Schedule	11	10
Ongoing Study Cohort 2		
Half-Day Schedule	10	9
Alternate-Day Schedule	8	6
Full Day-Schedule	1	4

Chapter 1 Placement Rates by Kindergarten Schedule

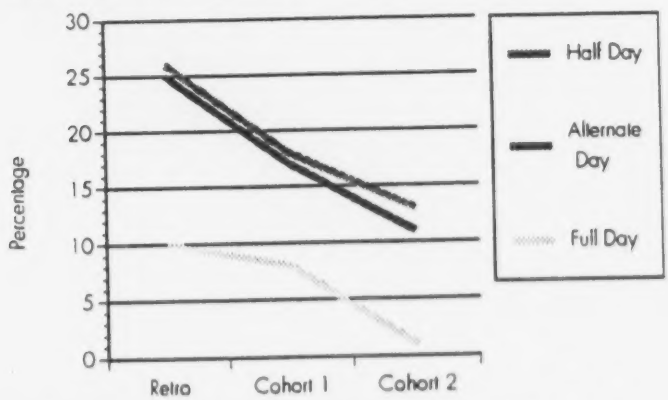


Figure 3

Grade Retention Rates by Kindergarten Schedule

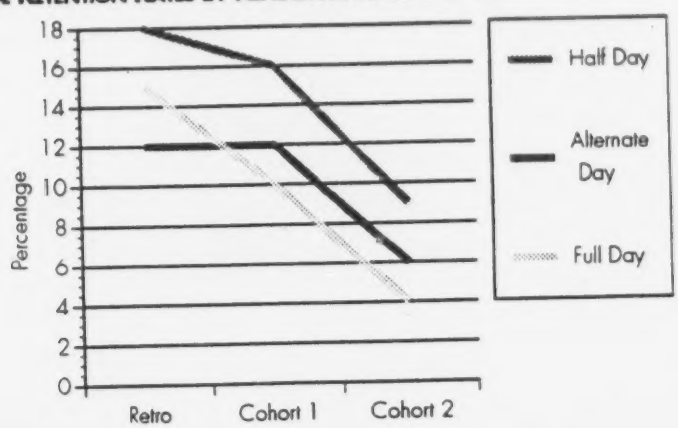


Figure 4

Qualifications of the Impact: There are very few qualifications to note for the impact of full-day, every-day kindergarten. Only a small percentage of the pupils in the two studies had to pay more for full-day kindergarten. In most cases, the provision of full-day kindergarten was at total cost to the school district. In one large school district participating in the study (district 26 in Table 2), eight school buildings were included in the study with one half-day and one full-day class operating in each school building. Enrollment in full-day kindergarten was made on a space available basis to any parent requesting such a schedule. Subset analysis results for that district are entirely consistent with the overall results reported in this report.

The findings comparing the performance of full-day versus half-day pupils are probably an underestimate of the true impact of a full day's exposure to an educational environment. Previous research in this state (Sheehan, 1988) has indicated that more than half (56 percent) of the pupils in half-day kindergarten in this state spend at least some portion of the rest of their day in child-care programs outside the home. At least some of these child-care programs are likely to have an educational component serving to complement the educational impact of half-day kindergarten in a fashion similar to the full-day programs.

The findings comparing kindergarten schedules are based upon a large number of children, over numerous years, in a variety of school districts. Subset analyses reveal no instances in which a school district offering full-day kindergarten had children whose average performance was lower than half-day pupils (in the same district or a matched district), and in almost all instances, the full-day pupils performed better than the half-day pupils. Analysis of covariance reveals no interactions with regard to the impact of kindergarten schedule. The effects of kindergarten schedule are consistent for boys and girls, for children attending preschool and those with no such experience, and for children irrespective of their age upon entrance to kindergarten.

One qualification worth noting is that the northeast quadrant of the state is represented in this research with more full-day kindergartens than other areas of the state. This reflects the current statewide distribution of full-day kindergartens.

Academic Test Performance as it Relates to Preschool Attendance

Defining this factor: Parents in the prospective longitudinal study were asked, during the winter of their child's kindergarten year, to indicate whether or not their child had attended preschool or day care in the preceding year, and if so, the average hours per day, days per week, and months of attendance. Parents were also asked to provide the name and address of the early childhood program that children had attended, if that information was known. For ease of writing, early childhood experience is referred to in the following text as "preschool attendance," although we acknowledge that day-care centers do not have strong enough educational components to be referred to as preschools in the educational sense.

For Cohort 1 of the prospective study (children attending kindergarten in 1986-87), return rates for this information were quite low (53 percent) due to delays in the request for information. A greater percentage of parents (74 percent) responded to our request for this information in Cohort 2 of the prospective longitudinal study. No such data are available for children who participated in the retrospective study, as such data were not a part of children's cumulative folders.

Direction and Magnitude of the Impact: Without a doubt, children who attend an early childhood program (preschool or day care) during their year before kindergarten experience greater subsequent success in the early elementary years than do children who have not had such an experience. Table 16 presents these kindergarten findings, while Table 17 presents these first-, second-, and third-grade findings.

KINDERGARTEN PERFORMANCE OF PUPILS IN PROSPECTIVE STUDY ON METROPOLITAN ACHIEVEMENT TESTS

PRIOR PRESCHOOL?		NO		YES	
	COHORT	N	%	%	N
TOTAL BASIC BATTERY	1	733	49*	61	596
	2	907	47*	60	1,283
TOTAL PREREADING	1	792	47*	60	655
	2	911	47*	59	1,244
AUDITORY SUBTEST	1	807	46*	60	668
	2	927	44*	65	1,377
VISUAL SUBTEST	1	796	48*	58	660
	2	926	51*	60	1,309
LANGUAGE SUBTEST	1	809	51*	59	670
	2	926	49*	59	1,316
QUANTITATIVE SUBTEST	1	753	51*	62	612
	2	929	50*	63	1,300

*P < .05, ALL SIGNIFICANT STATISTICAL TESTS FAVOR PRESCHOOL ATTENDANCE.

Table 16

FIRST- SECOND- AND THIRD-GRADE PERFORMANCE OF PUPILS IN ONGOING STUDY ON AVAILABLE STANDARDIZED TESTS

		NO PRESCHOOL		PRESCHOOL	
FIRST GRADE	COHORT	N	%	%	N
TOTAL BASIC BATTERY	1*	394	59	73	316
	2*	511	57	70	743
TOTAL READING	1*	398	59	73	320
	2*	521	58	70	767
TOTAL MATHEMATICS	1*	403	58	70	322
	2*	532	57	70	764
TOTAL LANGUAGE	1*	407	58	72	324
	2*	541	55	66	774
		NO PRESCHOOL		**PRESCHOOL**	
SECOND GRADE	COHORT	N	%	%	N
TOTAL BASIC BATTERY	1*	333	63	73	341
	2*	181	72	75	208
TOTAL READING	1*	335	61	71	346
	2*	320	61	70	410
TOTAL MATHEMATICS	1*	340	61	70	342
	2*	280	64	75	375
TOTAL LANGUAGE	1*	341	60	73	343
	1*	269	68	68	298
		NO PRESCHOOL		**PRESCHOOL**	
THIRD GRADE	COHORT	N	%	%	N
TOTAL BASIC BATTERY	1*	162	71	77	178
TOTAL READING	1*	249	61	72	216
TOTAL MATHEMATICS	1*	194	65	70	216
TOTAL LANGUAGE	1*	191	73	74	216

*P < .05, ALL ANALYSIS OF VARIANCE STATISTICAL TESTS FAVOR PRESCHOOL ATTENDANCE

Table 17

As Tables 16 and 17 indicate, kindergarten pupils with preschool experience perform approximately ten percentile points better than do pupils who have not had such experience. This relationship between preschool attendance and test performance is even stronger in the first grade for the subjects that have been tested to date at the first-grade level (Cohort 1 students, 1986-87 kindergartners). We also note that the absence of preschool is not related to comparative performance, as the average pupil without preschool performed at or somewhat above the national norm on these standardized tests. Rather, the presence of preschool attendance is related to better-than-average performance on national norms.

Table 18 also reveals that children attending preschool are much less likely to be placed in Chapter 1 or retained in the elementary grades. These findings of Chapter 1 placement and grade retention are consistently strong across both cohorts of the prospective study. No such data (preschool attendance) were available for the retrospective study children.

CHAPTER 1 PLACEMENT AND GRADE RETENTION BY PRESCHOOL ATTENDANCE

Table 18

PROSPECTIVE STUDY COHORT 1

PRESCHOOL	PERCENT IN CHAPTER 1	CHI SQUARE	PERCENT RETAINED	CHI SQUARE
YES	11	23.0*	6	6.8*
NO	23		11	

PROSPECTIVE STUDY COHORT 2

PRESCHOOL	PERCENT IN CHAPTER 1	CHI SQUARE	PERCENT RETAINED	CHI SQUARE
YES	3.5	35.0*	5	9.9*
NO	10.1	8		

* $p < .05$, STATISTICAL TESTS FAVOR PRESCHOOL ATTENDANCE

Qualifications of the Impact: Any study of the relationship between school performance and prior preschool attendance is threatened by the socioeconomic correlates of preschool attendance. In most cases parents must pay for early childhood experiences (Head Start is a notable exception), and the ability to pay for preschool (or day care) is a reflection of a larger ability to provide home environments that are rich in educational stimuli. We acknowledge this limitation in our data, and although our selection of school districts represented a balance of socioeconomic circumstances, we were not able to gather data on the socioeconomic circumstances of our subject population. Subset analyses of school districts that represent fairly low socioeconomic circumstances and fairly urban socioeconomic circumstances indicate the same strong, positive relationship between school performance and prior preschool attendance.

Academic Test Performance, Grade Retention, Special Education Placement, and Chapter 1 Placement as They Relate to Gender

Direction and Magnitude of the Impact: The impact of gender in the elementary grades is easy to summarize. Girls are much more likely to experience success in elementary grades than are boys. This conclusion is evident from an examination of standardized test data (at least through the third grade), Chapter 1 placements, grade retentions, and instances of special education placement. As Table 19 indicates, the average boy from kindergarten through the third grade performs less well on standardized tests than the average girl on almost all tests except mathematics tests. This relationship between gender and test performance does not appear to diminish until the fourth grade. The magnitude of this difference is typically five to eight percentile points.

STANDARDIZED TEST PERFORMANCE OF STUDENTS BY GENDER (IN PERCENTILES)

	RETROSPECTIVE STUDY		ONGOING LONGITUDINAL STUDY			
			COHORT 1		COHORT 2	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
KINDERGARTEN						
TOTAL TEST	61	68*	49	53*	51	55*
READING	63	70*	46	53*	50	55*
LANGUAGE	57	63*	50	52*	54	54
MATHEMATICS	60	61	51	55*	53	55*
FIRST GRADE						
TOTAL TEST	64	70*	59	66*	61	68*
READING	61	70*	57	65*	60	70*
LANGUAGE	61	70*	55	64*	64	63
MATHEMATICS	63	63	61	61	57	66*
SECOND GRADE						
TOTAL TEST	68	73*	58	66*	71	74
READING	63	70*	59	64*	61	66
LANGUAGE	64	74*	61	60	61	70*
MATHEMATICS	66	66*	61	60	68	68
THIRD GRADE						
TOTAL TEST	70	73	61	63		
READING	61	64*	54	58		
LANGUAGE	73	79*	56	64		
MATHEMATICS	64	68	57	57		
FOURTH GRADE						
TOTAL TEST		NO DATA				
READING	59	61				
LANGUAGE		NO DATA				
MATHEMATICS	61	61				

*$p < .05$, ALL ANALYSIS OF VARIANCE STATISTICAL TESTS FAVOR GIRLS, TO CONSERVE SPACE OBTAINED F VALUES OMITTED

Table 19

The impact of gender in the elementary grades is even clearer when examining the Chapter 1 placements, grade retentions, and special education placements of the pupils in the retrospective study (see Table 20). Twenty-five percent of all boys in the retrospective study were placed in Chapter 1 programs at some point in their elementary grades, whereas 19 percent of the girls in the study subsequently received Chapter 1 services. Similarly, 18 percent of the boys in the retrospective study failed at least one grade during the elementary grades, whereas only 12 percent of the girls were retained in grade.

Chapter 1 Placement and Grade Retention by Gender

Retrospective Study				
Gender	Percent in Chapter 1	Chi Square	Percent Retained	Chi Square
Boys	25	41.5*	18	50.3*
Girls	19	12		
Prospective Study Cohort 1				
Gender	Percent in Chapter 1	Chi Square	Percent Retained*	Chi Square
Boys	22	8.4*	16	10.9*
Girls	17		11	
Prospective Study Cohort 2				
Gender	Percent in Chapter 1	Chi Square	Percent Retained	Chi Square
Boys	7.5	1.7	8	7.6*
Girls	6	5		

* $p < .05$, statistical tests favor girls

Table 20

Academic Test Performance, Grade Retention, Special Education Placement, and Chapter 1 Placement as They Relate to Age of Kindergarten Entrance

Defining this Factor: The age at which a child can enter kindergarten is, for the most part, determined by state policy. Table 21 describes the specific dates for entering school across the country. As this table indicates, the most-frequent cutoff age is for a child to be five years old by September 1 of the year in which he or she enters kindergarten. In Ohio a child must be five years old by September 30 of the year in which he or she enters kindergarten.

Specific Dates for Entering Kindergarten

Dates When children Must Turn 5		Number of States
On/before	August 31	2
On/before	September 1	11
On/before	September 10	1
On/before	September 15	2
On/before	September 30	5
On/before	October 1	3
On/before	October 15	3
On/before	October 16	1
On/before	October 31	1
On/before	November 1	1
On/before	November 15	1
On/before	December 1	4
On/before	December 15	2
On/before	December 31	1
On/before	January 1	2
Four years eight months beginning school year		1
Local education agency option		7
No minimum age		1
Policy unknown		1

Table 21

The term "summer child" is used to refer to those children who turn five in the summer before their entrance to kindergarten. As Table 21 indicates, all states permit such children to enter kindergarten (as no states have a June 1 cutoff date). Obviously, parents may choose to hold a summer child out for another year, entering such a child into kindergarten a year later, although our data indicate that such a decision is made less than half the time in which a child is a summer child. In defining this factor, we have categorized pupils with valid birth dates into one of the five groups described in Table 22.

Ages of Children in Retrospective And Prospective Studies

Group	Age October 1 of Kindergarten Year	Retrospective Study	Prospective Study Cohort 1	Prospective Study Cohort 2
1*	64 Months or Less	30%	26%	26%
2	65 - 68 Months	31%	32%	32%
3	69 -72 Months	32%	29%	29%
4**	72 - 75 Months	5%	9%	9%
5***	76 Months or More	1%	3%	3%
		99%	99%	99%

* This group represents summer children who attended kindergarten as the youngest children in the class.

** This group represents summer children who could have attended kindergarten during the previous year but rather, attended a year later.

*** This group represents children who enter kindergarten a full year and three months behind their age peers.

Table 22

Direction and Magnitude of the Impact: The impact of being a summer child who attends kindergarten as the youngest in a peer group is quite strong, being evident in lower standardized test performance through, at least, the first grade. There are some indications that differences are apparent even in the third grade. (See Tables 23 and 24.)

STANDARDIZED TEST PERFORMANCE OF STUDENTS BY AGE GROUP RETROSPECTIVE STUDY (IN PERCENTILES)

	AGE GROUP YOUNGEST → OLDEST				
GRADE TEST TYPE	1*	2	3	4**	5
KINDERGARTEN					
TOTAL TEST	59	66	71	71	55
READING	63	68	71	63	55
LANGUAGE	55	61	64	64	51
MATHEMATICS	55	61	64	61	55
FIRST GRADE					
TOTAL TEST	63	66	70	68	55
READING	63	66	69	63	50
LANGUAGE	63	64	70	55	46
MATHEMATICS	59	63	68	63	52
SECOND GRADE					
TOTAL TEST	68	70	74	70	64
READING	69	68	70	64	56
LANGUAGE	64	71	73	59	66
MATHEMATICS	64	66	70	63	57
THIRD GRADE					
TOTAL TEST	68	73	73	73	NO DATA
READING	61	66	66	68	61
LANGUAGE	71	76	77	76	NO DATA
MATHEMATICS	64	68	70	73	46
FOURTH GRADE					
TOTAL TEST			NO DATA		
READING	59	61	63		NO DATA
LANGUAGE			NO DATA		
MATHEMATICS	59	61	64		

* SUMMER CHILDREN ATTENDING KINDERGARTEN
** SUMMER CHILDREN DELAYED ENTRANCE

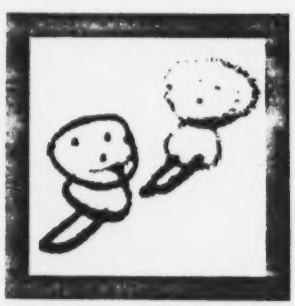


Table 23

STANDARDIZED TEST PERFORMANCE OF STUDENTS BY AGE GROUP - PROSPECTIVE STUDY (IN PERCENTILES)

	AGE GROUP				
	YOUNGEST →				OLDEST
GRADE TEST TYPE	1*	2	3	4**	5
COHORT 1					
KINDERGARTEN					
TOTAL TEST	40	50	61	57	35
READING	40	50	59	57	37
LANGUAGE	43	51	61	59	40
MATHEMATICS	42	53	63	57	38
FIRST GRADE					
TOTAL TEST	54	63	70	57	46
READING	53	64	68	55	44
LANGUAGE	53	61	66	53	46
MATHEMATICS	51	63	68	57	50
SECOND GRADE					
TOTAL TEST	58	66	66	55	52
READING	57	64	66	53	50
LANGUAGE	53	62	64	56	51
MATHEMATICS	57	64	66	55	47
THIRD GRADE					
TOTAL TEST	61	63	64	50	46
READING	53	57	59	52	46
LANGUAGE	61	61	63	53	49
MATHEMATICS	66	68	73	63	50
COHORT 2					
KINDERGARTEN					
TOTAL TEST	44	51	61	61	38
READING	44	51	61	61	38
LANGUAGE	44	51	61	63	41
MATHEMATICS	46	53	63	64	42
FIRST GRADE					
TOTAL TEST	58	64	70	64	53
READING	59	64	70	64	51
LANGUAGE	57	63	69	66	59
MATHEMATICS	57	61	66	61	46
SECOND GRADE					
TOTAL TEST	73	73	76	73	42
READING	66	66	66	74	37
LANGUAGE	64	66	66	70	49
MATHEMATICS	64	68	71	76	47

* SUMMER CHILDREN ATTENDING KINDERGARTEN

** SUMMER CHILDREN DELAYED ENTRANCE

Table 24

The impact of being a summer child who attends school as the youngest in a peer group is even clearer when one considers the finding that 25 percent of all summer children (in the retrospective study) who attend kindergarten as the youngest children in their class subsequently receive Chapter 1. (See Table 25.)

CHAPTER 1 INCIDENCE AND GRADE RETENTION BY AGE GROUP

AGE GROUP	PERCENT IN CHAPTER 1	CHI SQUARE	PERCENT RETAINED	CHI SQUARE
RETROSPECTIVE STUDY				
1*	26	22.0	21	118.8*
2	22		13	
3	19		19	
4**	22		10	
5	26		12	
ONGOING STUDY COHORT 1				
1*	28	34.9***	24	83.4***
2	20		10	
3	13		8	
4**	18		2	
5	22		17	
ONGOING STUDY COHORT 2				
1*	8	7.5	14	86.2***
2	6		6	
3	4		2	
4**	5		2	
5	9		2	

*SUMMER CHILDREN ATTENDING KINDERGARTEN

**SUMMER CHILDREN DELAYED ENTRANCE

***P < .05, CHI SQUARE ANALYSIS STATISTICAL TESTS FAVOR SUMMER CHILDREN WITH DELAYED ENTRANCE WHEN COMPARED TO THOSE ATTENDING KINDERGARTEN.

Table 25

Qualifications of the Impact: Numerous qualifications of the impact of kindergarten entrance age must be noted. First, we have no way of knowing why certain summer children were held back and others attended kindergarten. Reasons for holding children back from kindergarten or sending them to kindergarten may be related to children's subsequent school performance.

Second, we do not know what types of educational experiences may have been provided to children who were held back during the year in which they did not attend public school kindergarten. Did they experience another year of preschool? Were they in private kindergarten? Such experiences may have influenced their subsequent school performance.

Third, we have no information on the economic factors facing families as they make a decision to enroll or not enroll a summer child in kindergarten. For many families, enrollment in kindergarten may be based upon the need for a parent to resume employment in the work force on a full- or part-time basis.

We do not interpret the age-related data that we have presented as a rationale for holding children back from kindergarten entrance. Rather, we interpret these data to indicate a group of children at great risk of school failure. Educational intervention (such as Chapter 1) and increased sensitivity of families and educators to the needs of these young children might reduce that risk status.

Findings With Regard to School Behavior - Overall Study Results

In a very real sense, one measure of school behavior has already been presented and discussed. We acknowledge that the grade retention (discussed in previous sections) is based upon a combined perspective of academic test performance and the perceptions that teachers and parents have of a child's maturity. A child who is performing well academically may, on rare occurrences, be retained in grade if there is consensus that the child is too immature to progress to the next grade level. Keeping this concept in mind, readers are encouraged to refer to the previous sections of this report that address grade retentions.

The school behavior of kindergarten pupils in the prospective study was formally assessed in winter and spring of the kindergarten year by kindergarten teachers using the Hahnemann Elementary School Behavior Rating Scale. This standardized scale of sixty items evaluates children's classroom behavior along fourteen dimensions:

- Originality
- Independent learning
- Involvement
- Productive with peers
- Intellectual dependency
- Failure anxiety
- Unreflectiveness
- Irrelevant talk
- Social (over) involvement
- Negative feelings
- Holding back/withdrawn
- Critical/competitive
- Blaming
- Approach to teacher

As the titles of the dimensions suggest, several of the dimensions reflect positive aspects of children's behavior while other dimensions reflect negative aspects of children's behavior. The positive dimensions are originality, independent learning, involvement (in classroom activities), productive with peers, and approach to

teacher. A high score on these dimensions reflects positive performance while a low score reflects more-negative behavior. The negative dimensions are intellectual dependency, failure anxiety, unreflectiveness, irrelevant talk, social (over) involvement, negative feelings (regarding the teacher), holding back/withdrawn, critical/competitive, and blaming (failure on external causes). A high score on these dimensions reflects negative performance while a low score reflects more-positive behavior. The number of items related to each dimension varies from three to five. Thirty-five items are rated on a five-point scale, and the remaining items are rated on a seven-point scale. The number of possible points for each dimension varies from a low of four to a high of 35.

School Behavior As It Relates to Kindergarten Schedule Direction and Magnitude of the Impact: In both cohorts of the prospective study, a clear relationship between kindergarten schedule and classroom behavior emerges. Full-day kindergarten pupils are perceived by their teachers to be more original, more independent in learning, more involved in classroom activities, more productive with peers, less intellectually dependent, less prone to failure anxiety, less unreflective, less holding back or withdrawn, less blaming, and more willing to approach the teacher than are pupils in half-day kindergarten. As Table 26 indicates, there are no dimensions of children's behavior in which full-day pupils exhibit less-positive behavior than their half-day or their alternate-day peers.

Kindergarten Pupils' Reported Behaviors by Kindergarten Schedule

Teacher Perception of Children's Behavior	Schedule Half	Alt.	Full	Schedule Half	Alt.	Full
Cohort	1	1	1	2	2	2
+ Originality	11.1	11.0	12.4	10.8	10.0	11.6
range 4-20 N	(267)	(202)	(54)	(999)	(626)	(532)
+ Independent Learning	17.0	18.0	19.4	17.5	17.5	18.5
range 5-33 N	(264)	(195)	(54)	(996)	(628)	(531)
+ Involvement	17.3	18.2	19.0	17.0	17.5	18.5
range 5-27 N	(262)	(203)	(54)	(994)	(621)	(531)
+ Productive with Peers	13.5	14.3	14.2	13.5	13.5	14.1
range 3-21 N	(265)	(203)	(55)	(997)	(629)	(531)
Intellectual Dependency	12.6	12.4	10.6	11.2	11.2	10.4
range 4-24 N	(265)	(203)	(54)	(998)	(627)	(532)
Failure Anxiety	12.8	11.2	10.9	11.0	10.5	10.0
range 5-29 N	(266)	(203)	(54)	(999)	(626)	(506)
Unreflectiveness	8.0	7.6	6.4	7.2	6.9	6.6
range 3-17 N	(265)	(203)	(54)	(1000)	(629)	(532)
Irrelevant Talk	8.9	8.5	6.6	8.0	8.0	7.6
range 4-20 N	(266)	(203)	(54)	(1001)	(628)	(531)
Social (Over) Involvement	11.2	10.6	9.2	10.0	10.0	9.6
range 4-22 N	(266)	(203)	(53)	(999)	(629)	(531)
Negative Feelings	8.5	7.2	7.2	7.5	7.5	7.5
range 5-27 N	(266)	(202)	(54)	(1000)	(626)	(532)
Holding Back/Withdrawn	12.9	12.5	11.8	11.5	11.5	10.5
range 5-35 N	(266)	(202)	(55)	(998)	(626)	(531)
Critical/Competitive	8.7	8.0	8.0	8.0	8.0	8.0
range-22 N	(267)	(203)	(54)	(999)	(626)	(532)
Blaming	8.2	6.6	6.9	7.2	6.8	6.8
range 4-24 N	(265)	(201)	(54)	(997)	(629)	(532)
+ Approach to Teacher	16.1	15.9	16.3	15.6	15.2	17.2
range 4-24 N	(266)	(202)	(54)	(1001)	(630)	(532)

+ A high score for each of these items indicates positive behavior.

Table 26

Qualifications of the Impact: The consistency of these findings, across two cohorts of children and across the many dimensions of the Hahnemann Elementary School Behavior Rating Scale, leaves little room for doubt about the nature of the impact of kindergarten schedule on children's classroom behavior. We also note that the averages reported in Table 26 are all well within the normal range of expectation during the school year. In other words, the average kindergarten pupil in the study exhibits normal behavior, but full-day pupils exhibited more-positive behavior than did the pupils in half-day or alternate-day kindergartens.

School Behavior as it Relates to Preschool Attendance

Direction and Magnitude of the Impact: With very few exceptions, the kindergarten pupils with prior preschool experience are rated more positively by kindergarten teachers than are the pupils with no such experience. Kindergarten pupils with preschool experience are rated by their teachers to be more original, independent in learning, involved in classroom activities, less intellectually dependent, less prone to failure anxiety, and less holding back or withdrawn than are kindergarten pupils with no such experience. We do note, however, that kindergarten pupils with preschool experience are also rated by their teachers to be more negative toward teachers and the learning setting, and more critical or competitive with their peers than are kindergarten pupils with no such preschool experience. In all other measured behavioral dimensions, kindergarten pupils with preschool experience function similarly to those with no preschool. (See Table 27.)

KINDERGARTEN PUPILS' REPORTED BEHAVIORS

TEACHER PERCEPTION OF CHILDREN'S BEHAVIOR		PRESCHOOL ATTENDANCE			
		No	Yes	No	Yes
	COHORT	1	1	2	2
+ ORIGINALITY		11.2	11.1	10.7	11.5
RANGE 4-20	N	(160)	(164)	(833)	(1137)
+ INDEPENDENT LEARNING		17.2	18.6	17.8	18.4
RANGE 5-33	N	(156)	(159)	(828)	(1120)
+ INVOLVEMENT		17.7	18.2	17.3	18.0
RANGE 27	N	(157)	(163)	(820)	(1119)
+ PRODUCTIVE WITH PEERS		13.7	14.1	13.8	14.0
RANGE 3-21	N	(160)	(163)	(824)	(1120)
INTELLECTUAL DEPENDENCY		12.4	11.9	11.3	10.7
RANGE 4-24	N	(160)	(163)	(822)	(1120)
FAILURE ANXIETY		12.0	12.1	10.9	10.5
RANGE 5-29	N	(160)	(163)	(793)	(1071)
UNREFLECTIVENESS		7.7	7.3	7.0	6.9
RANGE 3-17	N	(160)	(163)	(826)	(1120)
IRRELEVANT TALK		8.8	8.0	7.8	7.9
RANGE 4-20	N	(160)	(164)	(833)	(1138)
SOCIAL (OVER) INVOLVEMENT		11.2	10.4	9.9	10.2
RANGE 4-22	N	(160)	(164)	(826)	(1122)
NEGATIVE FEELINGS		7.9	7.7	7.3	7.6
RANGE 5-27	N	(160)	(164)	(824)	(1117)
HOLDING BACK/WITHDRAWN		12.9	12.0	11.4	10.8
RANGE 5-35	N	(159)	(164)	(826)	(1119)
CRITICAL/COMPETITIVE		8.7	8.3	7.7	8.1
RANGE-22	N	(160)	(164)	(825)	(1116)
BLAMING		7.5	7.1	6.7	6.9
RANGE 4-24	N	(159)	(164)	(826)	(1118)
+ APPROACH TO TEACHER		16.0	15.9	16.1	16.1
RANGE 4-24	N	(160)	(164)	(828)	(1124)

+ A HIGH SCORE FOR EACH OF THESE ITEMS INDICATES POSITIVE BEHAVIOR.

Table 27

Qualifications of the Impact: As noted earlier, any study of the relationship between school performance and prior preschool attendance is threatened by the socioeconomic correlates of preschool attendance. In most cases parents must pay for early childhood experiences (Head Start is a notable exception), and the ability to pay for preschool (or day care) is a reflection of a larger ability to provide home environments that may influence children's observed classroom behaviors.

We acknowledge this limitation in our data, and although our selection of school districts represented a balance of socioeconomic circumstances, we were not able to gather data on the socioeconomic circumstances of our subject population. Subset analyses of school districts that represent fairly low socioeconomic circumstances and fairly urban socioeconomic circumstances do indicate the same strong, positive relationship between classroom behavior and prior preschool attendance.

School Behavior as it Relates to Gender

Direction and Magnitude of Impact: The impact of gender on kindergarten pupils observed in classroom behavior is perhaps the strongest of any variable being related to classroom behavior. To put it simply, kindergarten teachers rated the behavior of girls more positively than they rated boys' behavior on every behavioral dimension with the exception of originality (a dimension yielding no significant differences). As Table 28 indicates, girls exhibit more positive and less negative behaviors (in the judgment of kindergarten teachers) than do boys.

Kindergarten Pupils' Reported Behaviors by Gender

Teacher Perception of Children's Behavior		Gender			
		Boy	Girl	Boy	Girl
	Cohort	1	1	2	2
+ Originality		11.1	11.3	11.0	11.1
range 4-20	N	(270)	(251)	(1194)	(1180)
+ Independent Learning		17.1	18.2	17.5	18.3
range 5-33	N	(266)	(245)	(1181)	(1160)
+ Involvement		17.5	18.0	17.3	17.8
range 5-27	N	(266)	(251)	(1184)	(1155)
+ Productive with Peers		13.6	14.2	13.3	14.0
range 3-21	N	(271)	(250)	(118)	(1164)
Intellectual Dependency		12.7	12.0	11.4	10.9
range 4-24	N	(270)	(250)	(1180)	(1164)
Failure Anxiety		12.4	11.6	11.0	10.4
range 5-29	N	(270)	(251)	(1133)	(1109))
Unreflectiveness		8.2	7.2	7.5	6.6
range 3-17	N	(270)	(250)	(1182)	(1162)
Irrelevant Talk		8.2	8.2	8.5	7.4
range 4-20	N	(269)	(252)	(1196)	(1180)
Social (Over) Involvement		11.6	10.0	11.1	9.2
range 4-22	N	(269)	(251)	(1184)	(1166)
Negative Feelings		8.3	7.4	8.1	6.9
range 5-27	N	(269)	(251)	(1179)	(1160)
Holding Back/Withdrawn		13.4	11.9	11.6	10.8
range 5-35	N	(271)	(250)	(118)	(1163)
Critical/Competitive		8.5	8.3	8.5	7.6
range 4-22	N	(270)	(252)	(1182)	(1163)
Blaming		7.9	7.0	7.4	6.4
range 4-24	N	(268)	(250)	(1182)	(1161)
+ Approach to Teacher		14.9	17.1	15.1	16.8
range 4-24	N	(269)	(251)	(1189)	(1168)

+ A high score for each of these items indicates positive behavior.

Table 28

Qualifications of the Impact: The only qualification that we note for this finding is the observation that the results obtained from both cohorts of the prospective study are similar to those reported by Spivack and Swift (1975) in the *Manual for the Hahnemann Elementary School Behavior Rating Scale*. This scale is not designed to be free of gender bias; rather, it reflects the oft-reported observation that boys are more prone than girls to exhibit behavioral difficulties (unpaged, Spivack and Swift, 1975).

School Behavior as it Relates to Age of Kindergarten Entrance

Direction and Magnitude of Impact: The academic test performance findings (and grade retention findings) of summer children that have already been presented in this report are somewhat explained by the behavioral reports of kindergarten teachers. As Tables 28 and 29 indicate, summer children who attend kindergarten as the youngest of their peer group are viewed by kindergarten teachers (in the spring of their kindergarten year) as being less original, less independent in learning, less involved, less productive with peers, more intellectually dependent, more prone to failure anxiety, more unreflective, more prone to irrelevant talk, more holding back and withdrawn, more blaming, and less willing to approach teachers than their older peers. As Tables 29 and 30 indicate, the children in age groups three and four (those who turned five from February 1–September 30 of the year before the year they entered kindergarten) were judged by kindergarten teachers to exhibit the more-positive behaviors. This finding is consistent with the belief that summer children who enter kindergarten as the oldest of their peer group (those in group 4) perform more positively in kindergarten classes than do the summer children who attend kindergarten in the fall immediately following their fifth birthday.

KINDERGARTEN PUPILS' REPORTED BEHAVIORS BY AGE GROUP - COHORT 1

TEACHER PERCEPTION OF CHILDREN'S BEHAVIOR		YOUNGEST 1*	2	3	4**	OLDEST 5
+ ORIGINALITY		10.5	11.1	12.0	10.9	9.9
RANGE 4-20	N	(123)	(157)	(168)	(51)	(8)
+ INDEPENDENT LEARNING		16.3	17.7	18.9	18.0	14.8
RANGE 5-33	N	(122)	(156)	(162)	(49)	(8)
+ INVOLVEMENT		17.2	18.2	18.4	17.5	15.2
RANGE 5-27	N	(122)	(155)	(167)	(51)	(8)
+ PRODUCTIVE WITH PEERS		13.3	14.2	14.0	14.3	10.9
RANGE 3-21	N	(123)	(157)	(168)	(51)	(8)
INTELLECTUAL DEPENDENCY		13.9	12.4	11.3	11.9	12.5
RANGE 4-24	N	(123)	(156)	(168)	(51)	(8)
FAILURE ANXIETY		12.7	12.3	11.2	12.3	11.9
RANGE 5-29	N	(124)	(156)	(168)	(51)	(8)
UNREFLECTIVENESS		8.4	7.6	7.2	7.5	7.9
RANGE 3-17	N	(123)	(156)	(168)	(51)	(8)
IRRELEVANT TALK		9.0	8.4	8.2	8.2	9.6
RANGE 4-20	N	(124)	(156)	(168)	(51)	(8)
SOCIAL (OVER) INVOLVEMENT		11.0	10.7	10.7	10.9	11.2
RANGE 4-22	N	(124)	(155)	(168)	(51)	(8)
NEGATIVE FEELINGS		8.0	7.6	7.8	8.6	8.2
RANGE 5-27	N	(122)	(157)	(168)	(51)	(8)
HOLDING BACK/WITHDRAWN		14.0	12.9	11.4	12.3	15.7
RANGE 5-35	N	(124)	(156)	(168)	(51)	(8)
CRITICAL/COMPETITIVE		8.3	8.1	8.7	8.2	9.1
RANGE 4-22	N	(124)	(157)	(168)	(51)	(8)
BLAMING		7.8	7.4	7.1	8.1	6.6
RANGE 4-24	N	(122)	(155)	(168)	(51)	(8)
+ APPROACH TO TEACHER		16.2	16.3	16.0	15.0	13.0
RANGE 4-24	N	(124)	(156)	(168)	(50)	(8)

+ A HIGH SCORE FOR EACH OF THESE ITEMS INDICATES POSITIVE BEHAVIOR. FOR ALL OTHER ITEMS, A LOW SCORE INDICATES POSITIVE BEHAVIOR.

* SUMMER CHILDREN ATTENDING KINDERGARTEN

** SUMMER CHILDREN DELAYED ENTRANCE

Table 29

Kindergarten Pupils' Reported Behaviors by Age Group - Cohort 2

Teacher Perception of Children's Behavior		Youngest 1*	2	3	4**	Oldest 5
+ Originality		10.5	10.9	11.7	11.6	10.5
range 4-20	N	(538)	(690)	(625)	(203)	(54)
+ Independent Learning		17.1	17.6	18.9	18.9	16.3
range 5-33	N	(522)	(683)	(621)	(203)	(53)
+ Involvement		7.0	17.4	18.1	18.5	17.2
range 5-27	N	(520)	(682)	(621)	(202)	(54)
+ Productive with Peers		3.2	13.6	14.1	13.9	12.9
range 3-21	N	(522)	(685)	(620)	(202)	(54)
Intellectual Dependency		11.8	11.4	10.5	10.7	11.8
range 4-24	N	(519)	(683)	(621)	(203)	(53)
Failure Anxiety		11.1	10.9	10.3	10.2	11.6
range 5-29	N	(494)	(654)	(590)	(199)	(53)
Unreflectiveness		7.6	7.2	6.6	6.9	7.4
range 3-17	N	(521)	(684)	(621)	(203)	(54)
Irrelevant Talk		8.3	8.2	7.6	8.0	8.6
range 4-20	N	(537)	(691)	(627)	(203)	(54)
Social (Over) Involvement		10.5	10.2	9.8	10.3	10.7
range 4-22	N	(522)	(687)	(622)	(203)	(54)
Negative Feelings		7.6	7.5	7.4	7.9	8.6
range 5-27	N	(519)	(680)	(622)	(203)	(54)
Holding Back/Withdrawn		12.3	11.7	10.1	10.4	12.8
range 5-35	N	(523)	(684)	(619)	(203)	(53)
Critical/Competitive		8.1	8.0	8.1	8.5	8.1
range 4-22	N	(522)	(685)	(621)	(202)	(54)
Blaming		7.2	6.9	6.6	6.9	8.2
range 4-24	N	(521)	(684)	(621)	(203)	(54)
+ Approach to Teacher		15.9	15.0	16.3	16.5	16.4
range 4-24	N	(526)	(688)	(624)	(203)	(54)

+ A high score for each of these items indicates positive behavior. For all other items, a low score indicates positive behavior.

*Summer children attending kindergarten

**Summer children delayed entrance

Table 30

Qualifications of the Impact: Numerous qualifications of the impact of kindergarten entrance age have been noted. First, we have no way of knowing why certain summer children were held back and others went on to kindergarten. Reasons for holding children back or sending them on to kindergarten may be related to children's subsequent school performance.

Second, we do not know what types of educational experiences may have been provided to children who were held back during the year in which they did not attend public school kindergarten. Did they experience another year of preschool? Were they in private kindergarten? Such experiences may have influenced their subsequent school performance.

Third, we have no information on the economic factors facing families as they make a decision to enroll or not enroll a summer child in kindergarten. For many families, enrollment in kindergarten may be based upon the need for a parent to resume employment in the work force on a full- or part-time basis.

We do not interpret the age-related data that we have presented as a rationale for holding children back from kindergarten entrance. Rather, we interpret these data to indicate a group of children at great risk for school failure. Educational intervention (such as Chapter 1) and increased sensitivity by families and educators to the emotional and behavioral needs of these young children might help reduce their risk status.

Teaching Practices and Observed Learning Behaviors as They Relate to Kindergarten Schedule

There are several ways in which the behavior of teachers and children differ in the various kindergarten schedules. On an overall basis, teachers in half-day kindergartens spend a greater percentage of their time in administrative activities than do teachers in alternate or full-day kindergartens. Half-day kindergarten teachers also spend a greater percentage of their time leading large-group learning activities than do teachers in alternate- or full-day kindergartens. As Table 31 indicates, the teacher behaviors observed in half-day kindergartens did not differ greatly when comparing morning (A.M.) and afternoon (P.M.) sessions. The one teacher behavior that did demonstrate such a difference was circulating behavior. Half-day kindergarten teachers exhibited a greater percentage of circulating behavior in the morning session than was true in the afternoon session.

Teacher's Activities by Type of Kindergarten Schedule (As percent of observed activity in each type of kindergarten)

	Half Day (A.M.)	Half Day (P.M.)	Alternate Day	Full Day
Teacher administration	11%	12%	8%	9%*
Large-group teacher-involved learning activity	33%	35%	27%	27%*
Small-group teacher-involved learning activity	10%	10%	11%	11%
Out of room	7%	6%	16%	13%*
Transitional	12%	13%	10%	13%*
Clean-up	3%	3%	3%	4%
Circulating	12%	9%	11%	12%*
Other	11%	12%	13%	11%
Total Observed Activity	99%	100%	99%	100%

*$p < .05$ (Statistically significant difference related to full day)

Table 31

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The children's behaviors that were observed in the kindergarten classes also varied by kindergarten schedule. In a fashion consistent with observed teacher behavior, children in half-day kindergartens spent a greater percentage of their time in teacher-led large group learning activities than did children in either alternate- or full-day kindergartens. Children in alternate-day and full-day kindergartens also spent a greater percentage of their time in active free play than was true for children in half-day settings. Understandably, children in alternate or full-day kindergartens also spent a greater percentage of their time eating than was true for the half-day kindergarten pupils. (See Table 32.)

CHILDREN'S ACTIVITIES BY TYPE OF KINDERGARTEN SCHEDULE
(AS PERCENT OF OBSERVED ACTIVITY IN EACH TYPE OF KINDERGARTEN)

	HALF DAY (A.M.)	HALF DAY (P.M.)	ALTERNATE DAY	FULL DAY
TEACHER-LED LARGE-GROUP LEARNING ACTIVITY	40%	40%	35%	33%*
TEACHER-LED SMALL-GROUP LEARNING ACTIVITY	5%	4%	5%	4%
NON-TEACHER LED CENTER-BASED LEARNING ACTIVITY	5%	4%	4%	4%
SEAT WORK DONE ALONE	13%	11%	12%	13%
TRANSITIONAL ACTIVITIES	14%	18%	10%	14%*
SOCIO-DRAMATIC PLAY	1%	1%	1%	1%
ACTIVE FREE PLAY (RECESS)	8%	8%	12%	10%*
EATING	5%	4%	8%	8%*
OTHER ACTIVITY	4%	5%	6%	8%*
OUT-OF-ROOM	4%	4%	7%	4%*
TOTAL OBSERVED ACTIVITY	99%	99%	100%	99%

*P < .05 (STATISTICALLY SIGNIFICANT DIFFERENCE RELATED TO FULL DAY)

Table 32

To better understand the nature of teacher and child behavior in the various kindergarten schedules, we analyzed the observed percentage of each behavior for each hour of the classroom day. The full-day and alternate-day kindergartens were in session a maximum of eight hours. The half-day programs (both morning and afternoon) were in session a maximum of four hours. Figure 5 provides an analysis of the teacher administrative behavior that was observed during the course of the average kindergarten day. In presenting this analysis, we have adjusted the half-day p.m. sessions to align with the half-day a.m. sessions so that both types of sessions appear to begin during the first hours of the kindergarten day. Obviously, the exact time of that first hour is different for the a.m. session and the p.m. session.

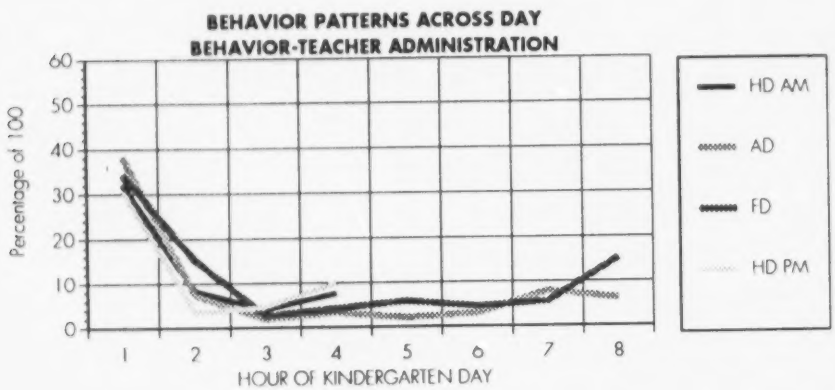

Figure 5

As Figure 5 indicates, the teacher administrative behavior during the first hour of the day was actually somewhat higher for the full-day and alternate-day kindergartens than for the half-day sessions. Once the first two hours of the kindergarten day were completed, observed teacher administrative behavior in the full-day kindergarten dropped until the final hour of the kindergarten day. In general, the third hour and last hour of the kindergarten day are remarkably similar across kindergarten schedules when considering teachers' administrative behaviors.

Figure 6 provides an analysis of teacher behavior while leading large groups of children. As this figure indicates, such behavior occurs somewhat less often in full-day and alternate-day kindergartens than is true for half-day classes, although there is a cyclical nature to teachers leading large groups in the full-day and alternate-day classes. Large-group activity rises and falls several times during the course of the full-day and alternate-day classes. In contrast, such teacher behavior peaks during the second hour of the half-day kindergarten and gradually declines for the rest of the half-day session.

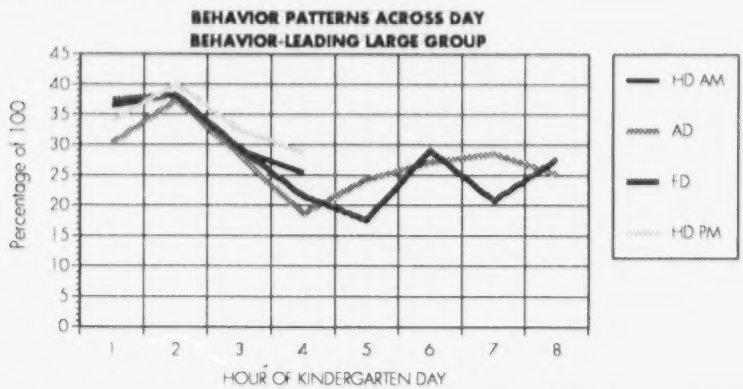

Figure 6

A similar cyclical pattern of behavior in full-day and alternate-day classes is evident when considering the teacher behavior while leading small groups. As Figure 7 indicates, teacher behavior in leading small groups rises in all classes during the third hour of the kindergarten day. It diminishes and rises again in the seventh hour of the full-day and the sixth and eighth hours of the alternate-day schedules.

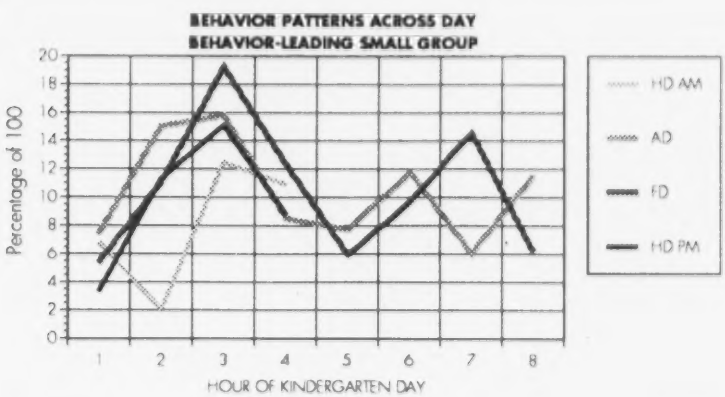

Figure 7

The circulating behavior of teachers is also cyclical, though less abrupt than was found for other teacher behaviors. As Figure 8 indicates, teacher circulating behavior reaches a height during the second and third hours of the kindergarten day in all kindergarten schedules. It rises again during the sixth hour of the full-day and alternate-day schedules.

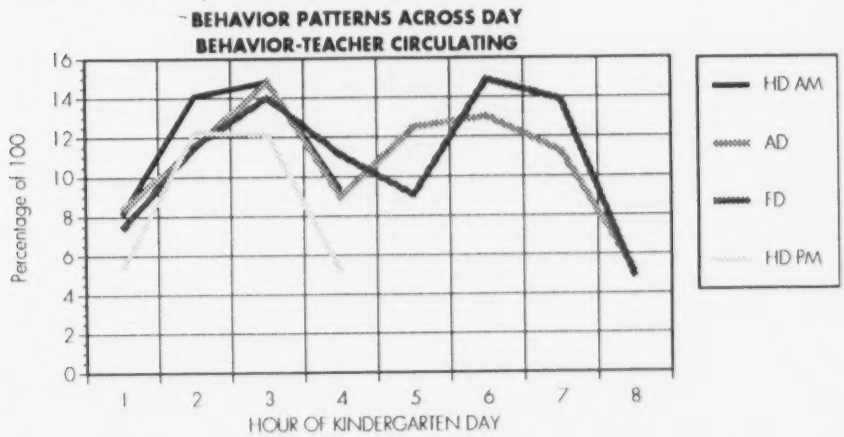

Figure 8

The behavior of children across the kindergarten day closely parallels that for kindergarten teachers. As Figure 9 indicates, the second hour in the kindergarten day represents the time when children are most likely to be participating in large-group teacher-led activities. The cyclical nature of teacher behavior in full-day and alternate-day classes observed in Figure 6 is almost identical to that found for children's behavior in Figure 9.

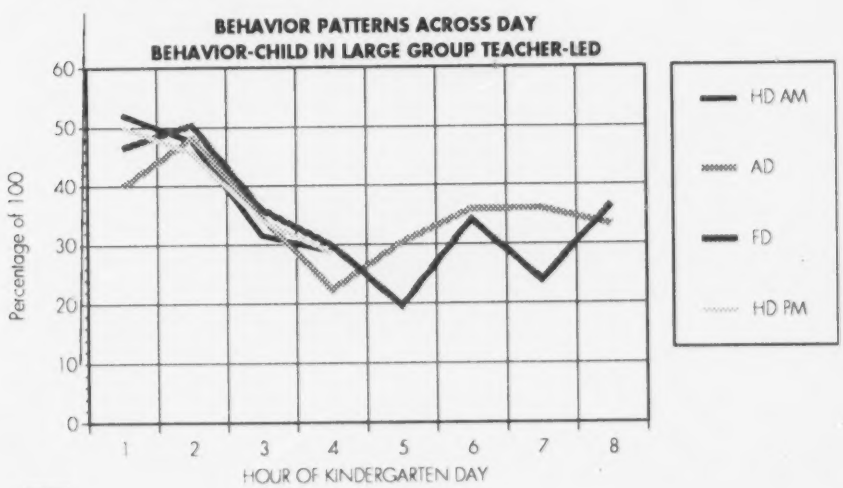

Figure 9

60

Figure 10 documents the remarkably small percentage of time kindergarten pupils spend in socio-dramatic play. Increased frequency of such play is only evident during the last hour of the half-day kindergartens.

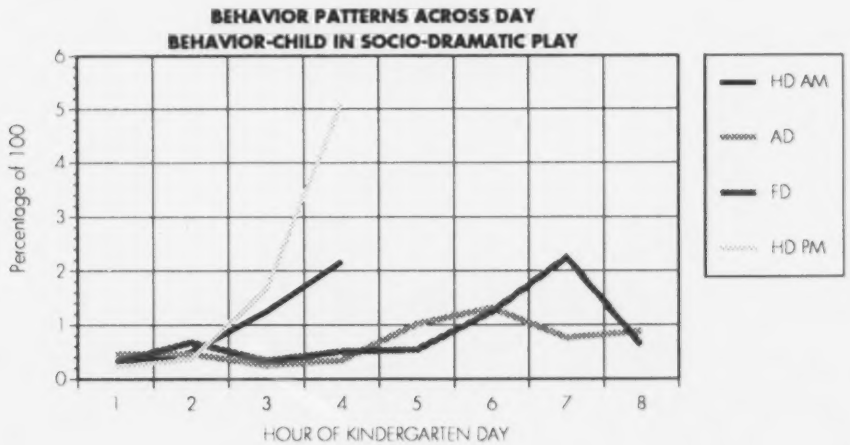

Figure 10

Analysis of the classroom behaviors of teachers and pupils reveals far more similarities than differences as a function of kindergarten schedule. The beginning and end of each day is very similar for all kindergarten schedules. Full-day and alternate-day kindergartens represent longer days, with cyclical patterns of behavior being evident among teachers and children.

Summary and Conclusions

This statewide longitudinal study was designed to investigate the effects of kindergarten schedule and prior preschool attendance on elementary children's school success. Data are reported from two phases of the study: a retrospective analysis of children's outcomes related to kindergarten attendance in the years 1982, 1983, and 1984; and a prospective analysis of two cohorts of children, one entering kindergarten in the fall of 1986 and one in the fall of 1987. The sample included 35 Ohio school districts, respectively. Procedurally, extant data found in cumulative folders were analyzed for the retrospective study. Outcome data for the ongoing study were gathered from the Metropolitan Readiness and Achievement Tests.

In planning these studies, and in initiating the data analyses, a number of interactions were hypothesized for the findings. Noteworthy is the total absence of interactions in the obtained data. Each factor discussed in this article operates as a powerful, main effect. Results from the longitudinal study indicate that children who attended preschool prior to kindergarten experience greater subsequent success in elementary school than those who do not attend. Results from both phases of the study indicate that participation in full-day kindergarten is positively related to subsequent school performance. It helps to be a girl in the elementary grades, and it is risky to be a summer child attending kindergarten as one of the youngest children in a class. The variables are additive, in the sense that certain combinations are more powerful than others. The child who is most likely to succeed in the elementary grades is a girl who attended preschool, turned five in January of the year before kindergarten entrance, and attended full-day kindergarten. The child at greatest risk is a boy, younger than most of his peers, who attended half-day kindergarten without the benefit of preschool. The variables in this study are not, however, interactive. Preschool is equally beneficial for boys and girls. Summer child status is equally risky for boys and girls.

A SAMPLE OF QUESTIONS TO BE ADDRESSED ON A FOLLOW-UP STUDY OF 6,000 PUPILS IN 32 OHIO SCHOOL DISTRICTS

(Children have been followed since kindergarten.)

A continued look at the effects of preschool attendance:

1. Do early gains associated with preschool attendance, gains which appear to diminish by grade three, reappear in grades 5,6, and 7? In what areas are such gains evident?
2. When looking at the entire spectrum of kindergarten through grade 8, what are the economic benefits/costs of attending preschool? Is preschool cost beneficial?

A continued look at the effects of kindergarten schedule (especially full day):

1. Do early gains associated with full-day kindergarten, gains which appear to diminish by grade two, reappear in grades 5, 6, and 7?
2. When looking at the entire spectrum of kindergarten through grade 8, what are the economic benefits/costs of full-day kindergarten? Is full-day kindergarten cost beneficial?

Looking at kindergarten entrance age over time:

1. Do the positive effects of being among the older children entering kindergarten continue beyond grade three?
2. Is there any reversal of effects associated with being older than classmates, especially for girls, as children enter the middle and junior high years?

Looking at the effects of gender across the entire elementary school spectrum:

1. Do the positive effects of being a girl continue beyond grade three?
2. Does the effect of gender begin to reverse, favoring boys?
3. At what grade level does this reversal begin and in what subjects?

Looking at children's performance across time:

1. Do children who display gifted performance in the early years (as measured by tests and other related indices) maintain such performance into the middle school years?

Other related policy issues to be addressed:

1. What are the long-term effects of retention in Ohio's schools?
2. What are the long-term effects of participation in Chapter One in Ohio's schools?

Implications for Parents and Families

Investment in preschool is beneficial for children resulting in higher achievement and lower retention rates in grade.

A full-day kindergarten experience is beneficial for children resulting in lower retention rates in grade and fewer placements in Chapter 1 remedial programs.

It is important for parents and families to enter into partnerships with school districts, and for parents to become involved in their child's education, especially for children who have not had a preschool experience, for boys, and for those who are considered young when they enter kindergarten.

A full-day or alternate-day kindergarten schedule provides for some continuity and consistency in that a child spends all day with the same person. This is especially important for children who are considered young at kindergarten entrance.

Implications for School Districts

Preschool and full-day kindergarten are beneficial for children and should be provided by the school district.

Collaborative arrangements with early childhood programs in the district should be made as a means of ensuring all children have the opportunity to attend preschool prior to entering kindergarten.

There are educational as well as long-term cost benefits to providing preschool and full-day kindergarten, resulting in less-frequent retention in grade and reduced placement in Chapter 1 programs.

There are cost detriments associated with curriculum that are not responsive to gender and the age spectrum and kindergarten entrance, leading to higher retention rates and Chapter 1 placements.

Developmentally appropriate programs must be implemented in kindergarten and the elementary grades to address children's diversity of need in regard to prior preschool attendance, gender, entrance age, and kindergarten schedule.

Districts must develop and implement policies that are inclusive of all children regardless of entrance age at kindergarten.

Districts must develop retention policies such that retention is rarely considered an appropriate option in a developmental program, but if employed, is based on a wide variety of considerations involving the principal, the teachers, the support staff, and parents.

Implications for Teachers

Teachers must be more open to the value of full-day kindergarten. They should be willing to try full-day kindergarten, as data indicate that those teachers who have tried full-day kindergarten prefer such a schedule.

Developmentally appropriate curricula must be implemented to address the needs of all children, but particularly those children who have not had preschool, who are boys, and who are considered young at kindergarten entrance.

The study points to the importance of early learning which, in turn, relates to the importance of articulation between teachers and parents, and between the teachers involved with the child's learning.

The classroom environment must allow more opportunities for socialization and play, both of which provide the significant base for language development in children.

Teachers must develop an understanding of alternative curricula and instructional practices that are responsive to the needs of young boys.

The classroom schedule should provide a balance of teacher-directed and child-initiated activities, active and quiet activities, independent and guided activities, and large-group, small-group, and individual activities.

A full-day kindergarten program should provide an unhurried learning environment that reflects a developmental program and that resists the inclination to increase academic pressures.

The transition between activities should flow smoothly and be kept at a minimum so that children can become involved in their learning experience without being interrupted.

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APPENDIX

Description of Subset Comparisons

Subset Comparison 1: District 1 - Half Day versus Full Day

A total of eight District 1 schools participated in the study for Cohort 1 and seven schools participated for Cohort 2. Each school offered two comparative kindergarten schedules. In one school, the comparative schedules were half day and alternate day. In the remaining schools, the kindergarten schedules were half day and full day. For purposes of this subset comparison, comparisons were made between the half-day schedule and the full-day schedule. The alternate-day class was not included in this subset analysis. (Note: Eleven kindergarten teachers in District 1 did not administer the quantitative subtest of the MRT for Cohort 1. These missing data also prevented the computation of total test scores for those students.) (Referred to as Subset Comparison 1: District 1 in 1986-1987 annual report.)

Subset Comparison 2: District 2 - Half Day versus Full Day

Two schools (four classes) from District 2 participated in the study. The classes included three full-day classes and one half-day class. (Referred to as Subset Comparison 2: District 2 in 1986-87 annual report.)

Subset Comparison 3: District 3 - Half Day versus Full Day

Two half-day and two full-day classes participated in the study for Cohort 2. (Not included in 1986-87 annual report.)

Subset Comparison 4: District 4 - Half Day versus Full Day

Two half-day and two full-day classes participated in the study for Cohort 2. (Not included in 1986-87 annual report.)

Subset Comparison 5: Districts 5 and 6 - Half Day versus Full Day

Ten half-day classes and ten full-day classes participated in this study for Cohort 2. (Not included in 1986-87 annual report.)

Subset Comparison 6: Districts 7 and 8 - Half Day versus Full Day

One school for District 7 and one school for District 8 participated in the study. Each school included two kindergartens, with one school having two full-day classes and the other school having two half-day classes. (Referred to as Subset Comparison 4: Districts 4 and 5 in 1986-87 annual report.)

Subset Comparison 7: Districts 9 and 10 - Half Day versus Full Day

Two schools for District 9 and one school for District 10 participated in the study. For Cohort 1, a total of nine classrooms representing four full-day and five half-day classes participated. For Cohort 2, a total of eight classrooms representing four full-day and four half-day classes participated. (Referred to as Subset Comparison 3: Districts 3 and 4 in 1986-87 annual report.)

Subset Comparison 8: Districts 11 and 12 - Half Day versus Full Day

One school from District 11 participated in the study as did one school from District 12. In the retrospective study, each school contained two classes with one school having two alternate-day classes and the other school having two half-day classes. In the prospective study, one school had two half-day classes while the other school had two full-day classes. (Referred to as Subset Comparison 5: Districts 7 and 8 in 1986-87 annual report.)

Subset Comparison 9: Districts 13 and 14 - Half Day versus Full Day

District 13 participated in the study (in Cohort 2) with two half-day classes while District 14 participated in the study with two full-day classes. (Not included in the 1986-87 annual report.)

Subset Comparison 10: District 15 - Half Day versus Alternate Day

District 15 participated in the study with two schools and four classes. One of the kindergarten classes was a half-day program while the remaining three classes were alternate-day programs. (Referred to as Subset Comparison 13: District 20 in 1986-87 annual report.)

Subset Comparison 11: District 16 - Half Day versus Alternate Day

A total of two schools and eight classes participated in the study from District 16. Each school contained either two half-day kindergarten classes or two alternate-day kindergarten classes. (Referred to as Subset Comparison 8: District 11 in 1986-87 annual report.)

Subset Comparison 12: District 17 - Half Day versus Alternate Day

Two schools from District 17 participated in this study. For Cohort 1, each school contained four classrooms, including an even number of half-day classes (four) and alternate-day classes (four). For Cohort 2, each school contained two classrooms, including two half-day classes and two alternate-day classes. (Referred to as Subset Comparison 7: District 10 in 1986-87 annual report.)

Subset Comparison 13: District 18 - Half Day versus Alternate Day

District 18 participated in the study with two schools and four kindergarten classrooms. Three of the kindergarten classrooms were alternate day while one kindergarten classroom was half day. (Referred to as Subset Comparison 6: District 9 in 1986-87 annual report.)

Artwork courtesy of Mrs. Adams' Evening Street Elementary School kindergarten class in Worthington.
Art also provided by Hillary Tinapple and Lauren Pesek.

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